


Final Status Survey Report for EaglePicher Lenexa, Kansas

Revision 1


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- ☐ New Plan
☐ Title Change
☒ Plan Revision
☐ Plan Rewrite

Effective
Date _____

EXECUTIVE SUMMARY

EaglePicher Pharmaceutical Services, Lenexa, KS (EPPS) owned and operated an approximately 24,000 square-foot pharmaceutical research and production facility located at 13605 W. 96th Terrace, Johnson, County, Lenexa, KS. The building housed an entry area, cafeteria, and office space in the front portion of the building and restricted access laboratories, as well as storage and maintenance areas in the back of the building. The facility operated as a research and production laboratory, specializing in high purity specialty chemicals for drug development. The building was constructed for this purpose in the mid-1980s and operations continued until recently when it was decided to decommission the facility. Decommissioning and closure activities at the facility were conducted to comply with the requirements of the facility's Nuclear Materials License issued by the State of Kansas Bureau of Air and Radiation.

EnergySolutions was contracted by Bionomics, Inc. as a representative of EaglePicher to provide decommissioning of the EaglePicher facility including complete demolition of the facility. EnergySolutions provided engineering and technical support to design and implement a radiological Final Status Survey (FSS) of the facility in accordance with the guidance contained in NUREG 1757 "Multi Agency Radiological Site Survey and Investigation Manual" (MARSSIM). This included fixed and removable measurements on structural surfaces of the building including walls, floor and ceilings and roof. Portions of the facility were shipped to a radioactive disposal facility based on a prior characterization of the facility (Reference 6.1). The portions of the facility shipped to a radioactive disposal facility were not included in the FSS as they were not being released. The portion of the building released by the FSS was shipped to a local CD industrial landfill for disposal. The maximum estimated total activity released to the landfill was less than 9.7×10^7 pCi or 4.5×10^{-2} pCi/g (2.4×10^{-2} pCi/g H-3 and 2.1×10^{-2} pCi/g C-14). Additional information on the activity estimate is provided in Attachment 7.5.

An estimated dose to the general public was generated based on airborne C-14 activity measured at four locations surrounding the site during building demolition activities. There was no direct exposure component to the dose as there were no radionuclides remaining on site that could contribute to a dose at the site border. The maximum exposure to a member of the public from airborne activity if they stood at the site boundary during the entire demolition process would have been 0.0013 millirem.

The overall survey performed by EnergySolutions included 384 fixed point beta measurements obtained on interior building surfaces along with 111 fixed point measurements on the exterior building surfaces. Survey areas were also scanned for beta activity and the maximum activity recorded.

In addition, 493 removable activity beta activity measurements were obtained on building surfaces.

A summary of the building survey data is provided below in Table 1. The detailed results are provided in Section 4 of this report.

Table 1: Final Status Survey Results Summary

Survey Unit	Location	Beta Fixed Point Measurements			H-3 Smears			C-14 Smears		
		No.	Average dpm/100 cm ²	Max dpm/100 cm ²	No.	Average dpm/100 cm ²	Max dpm/100 cm ²	No.	Average dpm/100 cm ²	Max dpm/100 cm ²
001	West Building	101	2,082	47,560	99	10.9	89.4	99	9.7	67.8
002	East Building	120	263	7,996	120	3.1	23.5	120	5.6	33.9
003	Exterior Walls	40	2,343	3,310	40	6.8	28.1	40	1.8	16.9
004	High Roof	28	3,105	7,200	28	9.2	46.0	28	4.3	22.3
005	Low Roof	30	1,729	2,758	30	3.0	71.2	30	2.7	11.9
006	Mezzanine Ceiling	30	3,478	9,210	30	16.2	37.5	30	16.6	127.9
007	Out Building	34	1,548	4,658	34	8.5	61.5	34	5.9	49.4
009B	Remaining Drain Pipe	2	5,510	5,510	2	706.5	796.0	2	181.0	191.0
010	Mechanical Room Floor	21	11,283	31,874	21	84.9	240.3	21	84.1	164.5
011	Stairwell to Mezzanine	41	23,977	47,817	41	56.1	144.8	41	42.9	177.0
012	West Hallway	18	5,163	15,645	18	13.3	62.5	18	12.5	46.5
013	Mezzanine Walls	30	19,252	35,566	30	21.9	114.8	30	32.9	96.5
All Measurements		495	1,275	47,817	493	5.8	796	493	5.3	191
Limits			60,000	60,000		6,000	6,000		6,000	6,000
Survey Unit	Location	Gamma Measurements			H-3 Soil Results			C-14 Soil Results		
		No.	Gamma µR/hr	Max Gamma µR/hr	No.	Average pCi/g	Max pCi/g	No.	Average pCi/g	Max pCi/g
008	Pavement	16	7.3	8.5						
009	Soil	31	10.5	11.9	34	1.4	15.1	34	2.6	13.6
009B	Drain Pipe Trench Soil	9	9.0	9.4	10	20.6	112.0	10	1.8	24.0
Limits						2,100	2,100		60	60

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1.0 PROPERTY DESCRIPTION

The site is shown in Figure 1 and the layout of the main building is shown in Figure 2. The main building on the property was one story with a partial mezzanine. It was slab and cinderblock construction with brick veneer and aluminum frame windows and doors. The roof was composed of asphalt and gravel. The first floor, 24,830 ft², was divided into office spaces and laboratories. The office areas, 16,728 ft², were mainly composed of wallboard walls, carpeted floors, and a drop ceiling. A tile linoleum floor was in the transitional space dividing the office areas and the laboratory areas in the center of the building. Common walls between the office spaces and the laboratory areas were composed of cinderblock. Floors in the laboratories were composed of sheet linoleum with cove base. Drop ceilings were present in all rooms with the exception of shipping and receiving, which has a high bay ceiling composed of metal girders and corrugated sheet metal.

The mezzanine, 7,571 ft², was located above the west half of the building. It was constructed of cement floor, metal girders, and corrugated sheet metal ceiling. The mezzanine contained numerous linear feet of air and effluent sampling tubing (copper and Tygon), exhaust ductwork and fans, and insulated air supply ductwork.

Laboratory areas occupied 6,254 ft² on the west half of the first floor of the building and were designated as Laboratories A through F, NMR Laboratory, and GMP Laboratories 1 and 2.



Figure 1: EaglePicher Lenexa Facility

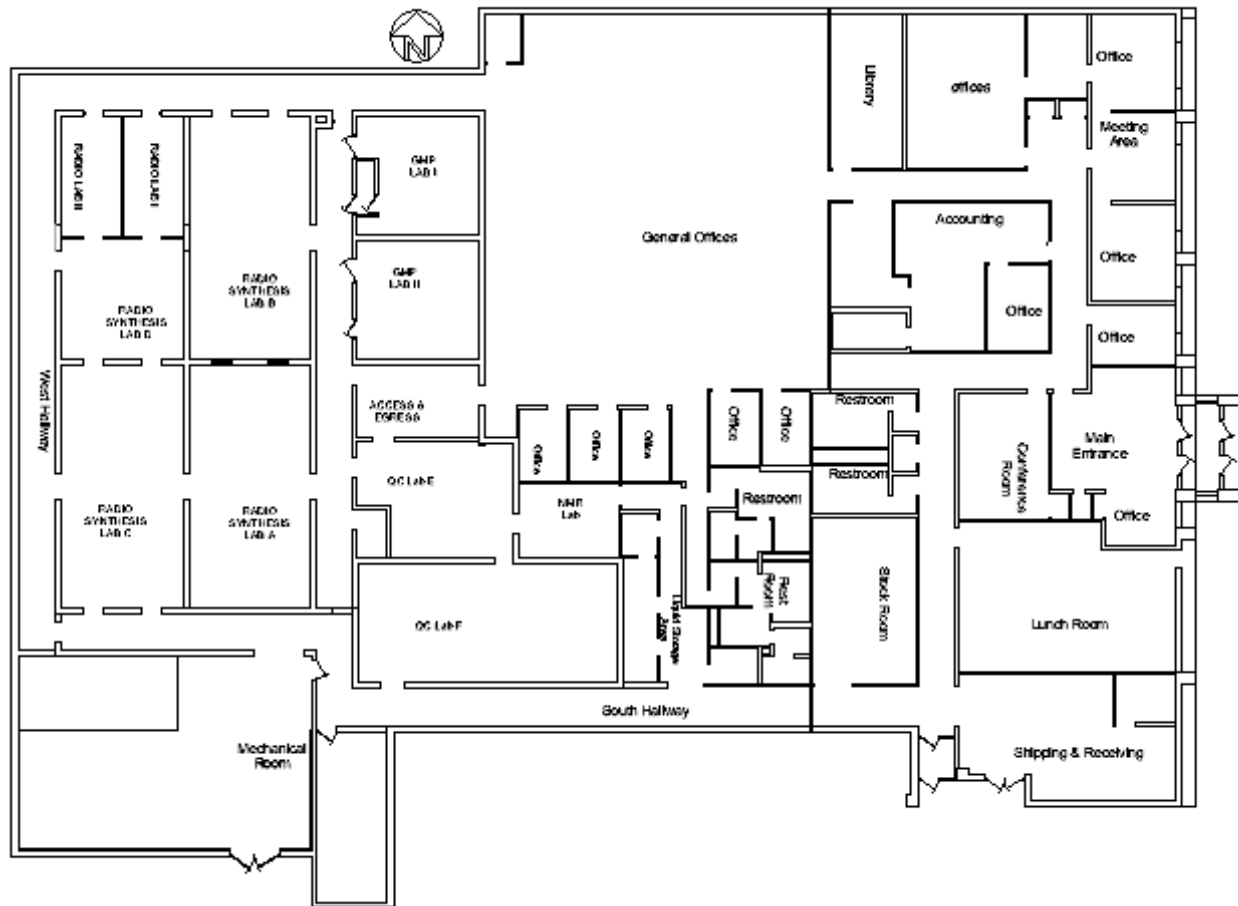


Figure 2: Building Layout

2.0 RELEASE CRITERIA

The unrestricted release criteria as agreed upon with the Kansas Department of Health and Environment are presented in the Table 2-1 below.

Table 2-1 Building Surface DCGLs

Radionuclide	DCGL (dpm/100 cm ²)
Total C-14	60,000
Removable C-14	6,000
Removable H-3	6,000
Radionuclide	DCGL (pCi/g)
C-14	60
H-3	2,100

3.0 FINAL STATUS SURVEY DESIGN

EnergySolutions (ES) performed the FSS scope under its NRC license (Reference 6.12, and Reference 6.13) using EnergySolutions approved procedures (Attachment 7.1).

3.1 Survey Units

Survey areas included laboratory rooms, office areas and roofs of the main building. A list of the survey units is provided below in Table 3-1 and the survey packages are presented with the survey results in Section 4 of this report.

Table 3-1 Survey Units

Survey Unit	Location	Area	Class
001	West Building Area	Floor, Walls & Ceiling	3
002	East Building Area	Floor, Walls & Ceiling	3
003	Outside Walls	Walls	3
004	High Roof	Roof	1
005	Low Roof	Roof	3
006	Mezzanine Ceiling	Ceiling	3
007	Out Building	Floor, Walls, Ceiling & Roof	3
008	Paved Areas	Pavement	3
009	Soil Areas	Soil	3
010	Mechanical Room	Floor	1
011	Mezzanine Stairwell	Floor & Steps	1
012	West Hallway	Floor	1
013	Mezzanine Walls	Walls	2

3.2 Instruments

Radiation detection and measurement instrumentation were selected based on the type and quantity of radiation to be measured. The instruments used for direct measurements were capable of detecting the radiation of concern to a MDC of at least 50% of the applicable DCGL values or less. The instrumentation used for the FSS are listed in Table 3-2.

The primary survey instrument used was the Ludlum Model 2350-1 Data Logger with Ludlum 43-68 gas flow proportional detector for surface scans and direct measurements of total beta activity. The Data Logger is a portable micro-processor computer based counting instrument capable of operation with NaI gamma scintillation, gas-flow proportional, GM, and ZnS scintillation detectors. The Data Logger is capable of retaining in memory the survey results and instrument/detector parameters for up to 1,000 measurements. Direct measurement data for total beta activity was then downloaded to a computer for subsequent reporting and analysis.

Removable surface activity measurements were analyzed using a Packard Tri-Carb.

Table 3-2: Survey Instrumentation

Instrument / Detector	Detector Type	Radiation Detected	Calibration Source	Use
Ludlum Model 2350/43-68	Gas-flow proportional (126 cm ²)	beta	¹⁴ C (β)	Beta scans & direct measurements
Ludlum Model 2350/44-10	2" × 2" NaI scintillator	gamma	¹³⁷ Cs (γ)	Gamma radiation scans & direct measurements
Packard Tri-Carb 2900TR	Liquid Scintillation	beta	³ H (β) ¹⁴ C (β)	Smear counting

3.3 Instrument Calibration

Survey instruments, counting devices, and other equipment used for radioactivity detection and measurement were cared for and maintained as discussed in CS-FO-PR-002 "Calibration and Maintenance of Radiological Survey and Sampling Equipment Procedure," (Listed in Attachment 7.1).

EnergySolutions calibrated the instruments and associated detectors on a semi-annual basis using National Institute of Standards and Technology (NIST) traceable sources and industry standard calibration equipment.

The instrument calibration included:

- high voltage calibration,
- discriminator/threshold calibration,
- window calibration,

- alarm operation verification, and
- scaler calibration verification.

The detector calibration includes:

- operating voltage determination,
- calibration constant determination, and
- dead time correction determination.

Calibration labels showing the instrument identification number, calibration date, and calibration due date were attached to all portable field instruments.

Calibration certificates for instruments used in the FSS are included in Attachment 7.2.

3.4 Response Checks and Radioactive Sources

Prior to use on-site, all project instrument calibrations were verified and initial response data collected. These initial measurements were used to establish instrument control charts and performance standards (response ranges) in which the instruments were tested against on a daily basis when in use as discussed in CS-FO-PR-004, "QA/QC of Portable Radiological Survey Instruments," (Listed in Attachment 7.1). The Packard Tri-Carb was not controlled under this procedure. The Tri-Carb software had a built in requirement for daily source checks which were automatically included in the internal control charts.

The daily response tests results were documented and compared to these operating parameters and ranges in the control charts to ensure that the instrumentation was functioning properly.

3.5 Survey Procedures

EnergySolutions performed surveys according to procedures (Attachment 7.1), and survey packages. The procedures identified survey instrument requirements, calibration, measurement and sample collection. The FSS included the following:

- Survey personnel collected smear samples and measurements with the results analyzed and/or calculated as defined in the survey packages.
- Direct field measurements and scan surveys were performed using appropriately calibrated instruments as per CS-FO-PR-002 (Attachment 7.1).
- Daily instrument quality control (QC) checks were performed before and after each day's work and as outlined in CS-FO-PR-004 (Attachment 7.1).
- Survey personnel marked and/or detailed on a survey map the sample and measurement locations to ensure reference back to a sample or measurement.
- All instrument logged data was be downloaded from the survey instrument into a database for storage, analysis, and reporting on a daily basis.
- All sample and measurement results were evaluated by the EnergySolutions Survey Manager.

3.6 Minimum Detectable Concentration (MDC) Calculations

3.6.1 Static Measurements for Total Beta Surface Activity

The MDC is defined as the smallest concentration of radioactive material in a sample that will yield a net positive count with a 5% probability of falsely interpreting background responses as true activity and a 95 % probability of correctly interpreting activity above background as true activity. The MDC is dependent upon the counting time, geometry, sample size, detector efficiency, and background count rate. The equation used for calculating the MDC, in dpm/100 cm², for total surface activity is:

$$MDC = \frac{\frac{2.71}{t_s} + 3.29 \sqrt{\frac{R_B}{t_s} + \frac{R_B}{t_B}}}{(\epsilon_i)(\epsilon_s) \left(\frac{A}{100 \text{ cm}^2} \right)} \quad (\text{Equation 3-1})$$

where:

- R_B = background count rate (counts per minute [cpm])
- t_s = sample count time (min)
- t_B = background count time (min)
- ε_s = surface efficiency (determined using ISO-7503)
- ε_i = 2π instrument efficiency
- A = detector area (cm²)

Instrument efficiencies and MDC are included along with detailed survey results in Section 4 of this report.

3.6.2 Removable Surface Activity

The Packard Tri-Carb report did not include MDC values. However the detection limit of any measurement device is determined by the signal to noise ratio. In Liquid Scintillation Counting (LSC) this signal to noise ration is expressed as a function of counting efficiency (E) and background contribution (B) and is known as the Figure-of-Merit (FOM) and is calculated during daily calibration runs. The FOM equation is:

$$FOM = E^2/B \quad (\text{Equation 3-2})$$

where:

- E = counting efficiency for the radionuclide of interest [%]
- B = background count rate (counts per minute [cpm])

According to the manufacturer of the Tri-Carb, FOM's for H-3 are typical about 180 and for C-14 are about 380 with larger values indicating a better signal to noise ratio. The FOM values observed during this FSS averaged 245 ± 9 for H-3 and 492 ± 20 for C-14.

3.6.3 Scan Surveys

In the case of the scan measurements, the counting interval is the time the probe is over a specific source of radioactivity. This time depends upon the scan speed, the size of the source, and the fraction of the detector's sensitive area that passes over the source; with the latter depending on the direction of probe travel. The scan speed is typically one probe width per second so the observation interval is 1 second.

The scan MDC for beta scanning where there are elevated beta count rates (i.e., >500 cpm), the MDC is determined using the Equation 3-3. The MDC equation is as follows:

$$MDC_{Scan} = \frac{d' * \sqrt{b_i} * \frac{60}{i}}{\sqrt{p} * \varepsilon_i * \varepsilon_s * \frac{A}{100}} \quad (\text{Equation 3-3})$$

Where:

d'	=	Decision error taken from Table 6-5 of MARSSIM
b _i	=	Background counts per observation interval
i	=	Observation counting interval in seconds (detector width divided by the scan speed)
p	=	Surveyor Efficiency (typically 50%)
A	=	Detector Area (cm ²)

3.7 **Sample Size and Location Determination**

No material-specific background corrections for buildings were performed for total beta measurements except for the bare concrete walls in the mezzanine area.

Reference Coordinate System

A reference coordinate system was established for each survey unit. Survey locations were referenced to the southwest corner of each survey unit and survey locations were marked on the floor or wall surface. Survey maps were generated that indicated the location of grids and soil sampling locations.

Random survey patterns were used for Class 3 areas and gridded data point locations were used for Class 1 and Class 2 areas. In some Class 3 areas however, a 1-meter grid pattern was utilized with each grid assigned a number and the grid numbers randomly selected for survey. This method was utilized when the shape survey unit was not regular such as "L" shaped, "U" shaped or rectangular with odd shaped appendages.

The survey protocol included locating survey points relative to mapped floor locations. The ceiling locations were directly above the floor locations. The wall locations were on the nearest wall from the floor location and they alternated elevations between 3-ft and 7-ft above the floor. These locations were marked on floors and walls prior to surveys being performed.

The minimum number of measurement and sampling locations were determined using the COMPASS code and these results are identified in Table 3-3 below along with the number of measurements obtained during the Final Status Survey. The COMPASS results are included along with survey location calculations in Attachment 7.5.

Table 3-3: Survey Measurement Requirements

Survey Unit	Location	Area	Class	Survey Locations		Scan
				Min	FSS Actual	
001	West Building	Floor, Walls & Ceiling	3	14	101	10-25%
002	East Building	Floor, Walls & Ceiling	3	13	120	10-25%
003	Outside Wall	Walls	3	14	40	25%
004	High Roof	Roof	2	14	28	25%
005	Low Roof	Roof	3	14	30	25%
006	Mezzanine Ceiling	Ceiling	3	14	30	10%
007	Out Building	Floor, Walls, Ceiling & Roof	3	14	34	10-25%
008	Paved Areas	Pavement	3	14	16	10%
009	Soil Areas	Soil	3	22	31	10-100%
009B	Outdoor Areas	Remaining Drain Pipe & Soil	3	9	9	0%
010	Mechanical Room	Floor	1	15	21	100%
011	Mezzanine Stairwell	Floor	1	15	41	100%
012	West Hallway	Floor	1	15	18	100%
013	Mezzanine Walls	Walls	2	28	30	25%

3.8 Survey Instructions

In general, the survey units contained the following survey elements:

- Beta scan surveys in all areas, with a 100% scan in Class 1 areas and a 10 to 25% scan in Class 2 and Class 3 areas.
- Systematic direct beta measurements were obtained from floors walls and ceilings in Class 1 and Class 2 areas and random direct beta measurements were obtained from floors walls and ceilings in Class 3 areas. Drop ceilings were removed prior to performing the FSS to allow direct access to the underside of the corrugated metal roofing material.
- Systematic beta removable activity (smear) measurements were obtained from all floors walls and ceilings at the same locations where fixed measurement readings were obtained.

4.0 FINAL STATUS SURVEY RESULTS

4.1 Data Reduction and Evaluation

Direct measurements were obtained for total beta surface activity using the Ludlum Model 2350-1 Data Logger system. Upon completion of a survey, the contents of the Data Logger's memory were downloaded into a database that converts counts into dpm/100 cm² and generates survey reports. The data base was loaded with information about the project and survey instrumentation prior to the performance of the FSS. This information included site identification, survey technician names and identification, Ludlum 2350-1 serial numbers with calibration dates, detector types with serial numbers, detector area, radiation detected, efficiencies and calibration dates. During the performance of surveys the EaglePicher site was selected along with the technician performing the surveys, survey instrument, specific detector used, type of survey, radiation type and survey date. The data base then verified that the instrument and detector calibration was current and applied the correct backgrounds, count rates, detector surface areas and calibration information to generate survey reports in terms of dpm/100 cm².

After the survey reports were complete they were reviewed for completeness and accuracy by the survey technician. This technician review includes the following:

- Survey description is correct and complete and in clear English
- Survey measurement type is correct
- User ID is correct and technician name is also correct
- Instrument model, serial number, and cal due date are correct
- Detector model, serial number, type, and detector calibration due date are correct
- Detector efficiency is correct and survey location codes are correct

The completed survey reports were inserted in the survey package that typically includes the following items:

- Survey Package Worksheet. The worksheet was also reviewed for completeness and accuracy by the survey technicians and the survey manager and includes Survey Maps
- Beta Fixed Point Survey Reports
- Smear Survey Reports, and

Data and document control included the maintenance of the raw data files, translated data files, and documentation of corrections made to the data. The data files were backed up on a daily basis.

4.2 Results Summary

The overall survey performed by EnergySolutions included 503 fixed point beta measurements obtained on building surfaces. Survey areas were also scanned for beta activity and the maximum activity recorded.

In addition, 493 removable beta activity measurements were obtained on building surfaces.

Gamma scans and gamma fixed measurements were performed on outdoor paved areas.

Site soil areas including the area beneath the building floor slab were surveyed and sampled. Surveys were made using a 2" by 2" NaI detector and the survey activity recorded. Note that C-14 and H-3 cannot be detected using a gamma survey instrument, these surveys were performed to demonstrate that only background levels of gamma emitting radionuclides were on site. Surface samples (~0 to 6-in deep) were obtained based on random survey locations. Soil sample results are provided in section 4.3.9 "SU009-Soil Areas" of this report.

Table 4-1 below provides a summary of the survey data. Detailed results are provided by survey package in the sections of the report that follow.

Table 4-1 Survey Results Summary

Survey Unit	Location	Beta Fixed Point Measurements			H-3 Smears			C-14 Smears		
		No.	Average dpm/100 cm ²	Max dpm/100 cm ²	No.	Average dpm/100 cm ²	Max dpm/100 cm ²	No.	Average dpm/100 cm ²	Max dpm/100 cm ²
001	West Building	101	2,082	47,560	99	10.9	89.4	99	9.7	67.8
002	East Building	120	263	7,996	120	3.1	23.5	120	5.6	33.9
003	Exterior Walls	40	2,343	3,310	40	6.8	28.1	40	1.8	16.9
004	High Roof	28	3,105	7,200	28	9.2	46.0	28	4.3	22.3
005	Low Roof	30	1,729	2,758	30	3.0	71.2	30	2.7	11.9
006	Mezzanine Ceiling	30	3,478	9,210	30	16.2	37.5	30	16.6	127.9
007	Out Building	34	1,548	4,658	34	8.5	61.5	34	5.9	49.4
009B	Remaining Drain Pipe	2	5,510	5,510	2	706.5	796.0	2	181.0	191.0
010	Mechanical Room Floor	21	11,283	31,874	21	84.9	240.3	21	84.1	164.5
011	Stairwell to Mezzanine	41	23,977	47,817	41	56.1	144.8	41	42.9	177.0
012	West Hallway	19	6,073	28,742	18	13.3	62.5	18	12.5	46.5
013	Mezzanine Walls	30	19,252	35,566	30	21.9	114.8	30	32.9	96.5
All Measurements		495	1,275	47,817	493	5.8	796	493	5.3	191
Limits			60,000	60,000		6,000	6,000		6,000	6,000
Survey Unit	Location	Gamma Measurements			H-3 Soil Results			C-14 Soil Results		
		No.	Gamma µR/hr	Max Gamma µR/hr /hr	No.	Average pCi/g	Max pCi/g	No.	Average pCi/g	Max pCi/g
008	Pavement	16	7.3	8.5						
009	Soil	31	10.5	11.9	34	1.4	15.1	34	2.6	13.6
009B	Drain Pipe Trench Soil	9	9.0	9.4	10	20.6	112.0	10	1.8	24.0
Limits						2,100	2,100		60	60

4.3 Results by Survey Unit

The survey results for each survey unit include a Summary Results Table, a Survey Package with maps, Results Tables and Charts, the 2350-1 Download Data tables and Charts and the Smear Results Data.

4.3.1 SU001- West Building

This was initially all a Class 3 survey unit. Initial surveys revealed some areas with activity close to or in excess of the release limit. Some areas were remediated and reclassified as Class 1 and some areas were only reclassified.

The Machine Room floor had some areas in excess of limits (60,000 dpm/100 cm²). Most of these areas were decontaminated and the Machine Room floor was changed to a Class 1 area (SU010) and resurveyed. One area of the floor was removed as radioactive waste and this area was removed from the Final Status Survey (FSS).

The Mezzanine Stairwell floor and steps had some areas in excess of limits (60,000 dpm/100 cm²). The floor and steps were decontaminated and the area resurveyed as a Class 1 area SU011).

The West Hallway floor had some areas in excess of limits (60,000 dpm/100 cm²). The remaining linoleum was removed and the floor cleaned. One small area on the floor still exceeded limits. The West Hallway floor was changed to a Class 1 area (SU012) and resurveyed. In addition the painted block walls were also contaminated from the floor up to the ceiling. The walls and a part of the floor were removed as radioactive waste and not included in the Final Status Survey (FSS).

Summary results are provided in Table 4-2 which is followed by the Survey Package Worksheet, a survey map, survey data sheets, charts presenting the survey data, instrument download reports and the smear results from the Packard Tri-Carb Liquid Scintillation counter.

Table 4-2 SU001 Summary Results

Summary Survey Unit 001 West Building, Class 3	Beta	Beta Scan Maximums (dpm/100cm ²)	H-3 Smear (dpm/100cm ²)	C-14 Smear (dpm/100cm ²)
	Fixed Reading (dpm/100cm ²)			
Number	101	5	99	99
Average	2,082	20,646	11	10
Standard Deviation	5,893	N/A	14	11
Maximum	47,560	47,560	89	68



FSS Survey Package Worksheet for
EaglePicher SU001

Package Identification No.: SU01F/SU01S	Prepared by: Paul C. Ely
Location: Building West Interior	Date Prepared: 9/30/2009
Area Classification: Class 3	Signature: <i>Paul Ely</i>

Area Description
The survey area includes the floor, walls and ceiling.

Historical Information
Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3.

General Survey Instructions
<ol style="list-style-type: none"> 1. Use gas proportional detector model numbers 43-68, or equivalent detector as approved by the ES PM for beta surface activity surveys. The total instrument efficiency should use the following factors: <ul style="list-style-type: none"> • ϵ_i, 2π instrument efficiency from calibration papers. If a 4π efficiency is reported, calculate the 2π efficiency as follows using a 5% beta Back Scatter factor (BS). $\epsilon_i = (2 * \epsilon_{4\pi}) \backslash (1 + BS)$ • ϵ_s, the beta surface efficiency is 25%. • ϵ_t, the total beta efficiency = $\epsilon_i * \epsilon_s$ 2. Perform surface scans at a scan speed of 1 probe width per second or less for the 43-68. Any locations that exceed 2,500 cpm beta above background should be marked with a felt tip pen or equivalent and the extent of the elevated area recorded. <ul style="list-style-type: none"> • 25% scan of floor and lower walls (6-feet and below), for beta contamination and 10% scan of upper walls and ceiling for beta contamination. 3. Perform direct beta surface activity measurements at each measurement location. All ceiling surveys locations are directly above marked floor survey locations. Wall measurement locations are determined by extending the survey grids from the floors up the walls and obtaining measurements at alternating elevations of 3-feet from the floor and 7-feet from the floor. Mark and the survey location on the walls with a felt tip pen or equivalent. All surveys locations are referenced from the southwest corner of the survey unit. Random survey locations were generated for this class 3 survey unit. 4. Collect a removable surface activity sample (smear) over an area of 100 cm² in size at each measurement location provided on survey maps and place the smear in a liquid scintillation vial immediately after it was taken.

Special Instructions

- | | |
|--|---|
| <ul style="list-style-type: none"> • Source check instrumentation to C-14 for beta measurements. • The static MDC for total beta activity measurements shall be less than 3,000 dpm/100 cm². • Perform a minimum of three one-minute field backgrounds using the plastic shield on the survey surface. • Log scan measurements or record maximum scan measurement results in cpm on a Grid Scan Record. | <ul style="list-style-type: none"> • Randomly generated measurement and sampling locations are located on the attached survey map. If any location is inaccessible, offset the measurement location to the nearest usable location and mark the survey location on the map. • The attached map provides floor measurement and sampling locations (ceiling and wall locations are based on floor locations). |
|--|---|

[illegible]

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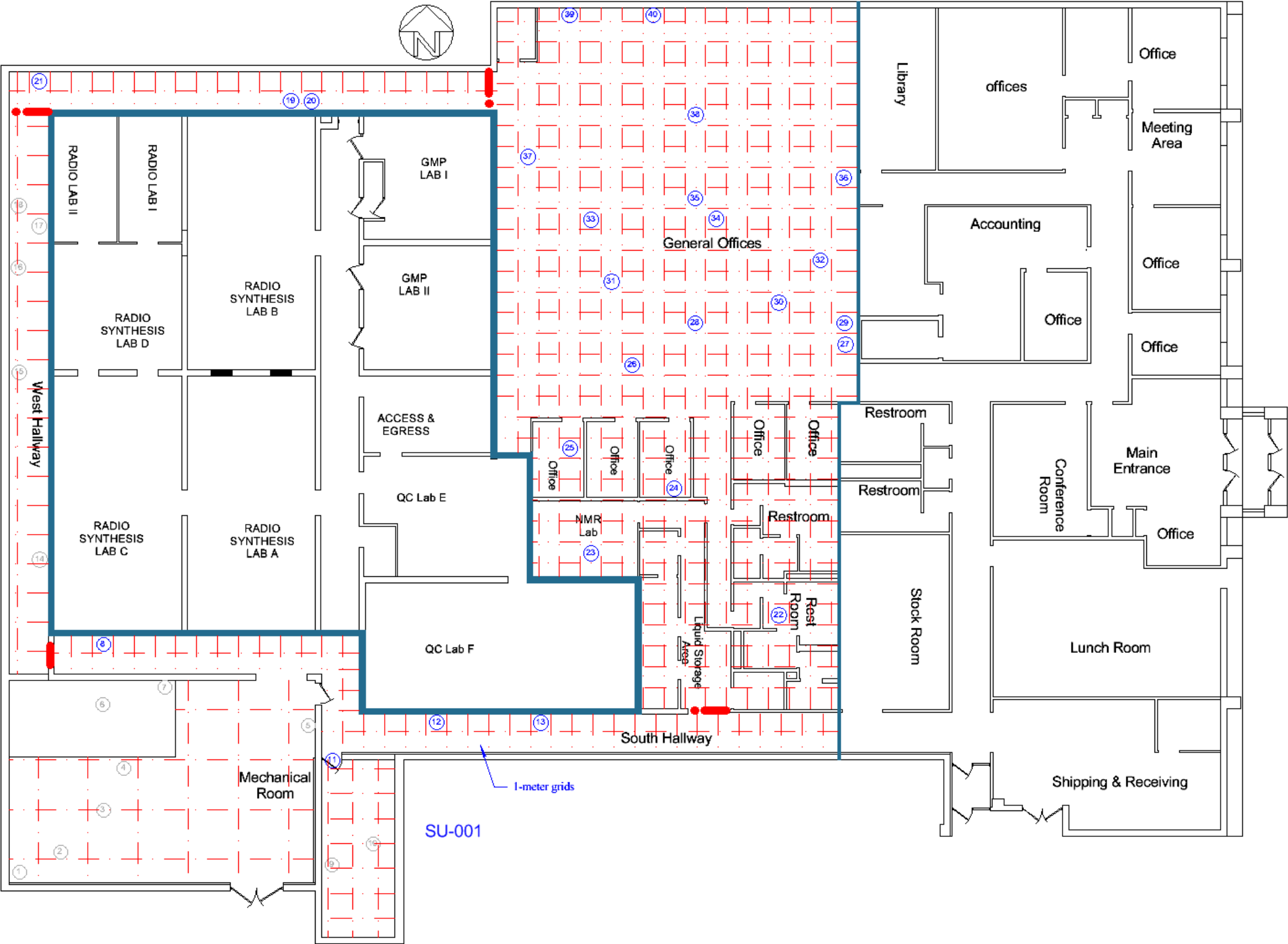


Figure 4-1 SU001 Survey Map

**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

EaglePicher FSS Data Sheet
Survey Unit 001
West Building

Detector Type	Detector SN	Detector (cm ²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 43-68 (beta)	095523	126	9/30/10	2350-1	80502	9/30/10
Ludlum 43-68 (beta)	119337	126	9/30/10	2350-1	95359	9/30/10
Packard Tri-Carb B2555	401663	NA	Daily	NA	NA	NA

Survey Point	Loc.*		Beta		H-3		C-14
			Fixed Reading (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)
1	F	Floor	SU010	60,000	SU010	6,000	SU010
2	F	Floor	SU010	60,000	SU010	6,000	SU010
3	F	Floor	SU010	60,000	SU010	6,000	SU010
4	F	Floor	SU010	60,000	SU010	6,000	SU010
5	F	Floor	SU010	60,000	SU010	6,000	SU010
6	F	Floor	To Radwaste	60,000	To Radwaste	6,000	To Radwaste
7	F	Floor	To Radwaste	60,000	To Radwaste	6,000	To Radwaste
8	F	Floor	4,154	60,000	56.5	6,000	67.8
9	F	Floor	SU011	60,000	SU011	6,000	SU011
10	F	Floor	SU011	60,000	SU011	6,000	SU011
11	F	Floor	7,488	60,000	28.4	6,000	51.5
12	F	Floor	846	60,000	0.0	6,000	25.2
13	F	Floor	719	60,000	0.0	6,000	18.3
14	F	Floor	SU012	60,000	SU012	6,000	SU012
15	F	Floor	SU012	60,000	SU012	6,000	SU012
16	F	Floor	SU012	60,000	SU012	6,000	SU012
17	F	Floor	SU012	60,000	SU012	6,000	SU012
18	F	Floor	SU012	60,000	SU012	6,000	SU012
19	F	Floor	1,032	60,000	9.3	6,000	9.3
20	F	Floor	804	60,000	7.3	6,000	23.0
21	F	Floor	1,066	60,000	38.5	6,000	40.2
22	F	Floor	2,132	60,000	36.9	6,000	26.8
23	F	Floor	47,560	60,000	NA	6,000	NA
24	F	Floor	567	60,000	11.6	6,000	2.8
25	F	Floor	533	60,000	10.5	6,000	14.1
26	F	Floor	-313	60,000	0.0	6,000	1.6
27	F	Floor	-220	60,000	0.0	6,000	6.4
28	F	Floor	0	60,000	1.9	6,000	10.0
29	F	Floor	-330	60,000	4.9	6,000	0.0
30	F	Floor	-212	60,000	12.3	6,000	8.1
31	F	Floor	212	60,000	6.6	6,000	6.1
32	F	Floor	93	60,000	28.2	6,000	15.2
33	F	Floor	178	60,000	1.5	6,000	11.3
34	F	Floor	-305	60,000	15.5	6,000	0.0
35	F	Floor	398	60,000	13.4	6,000	16.2
36	F	Floor	-288	60,000	0.0	6,000	4.7
37	F	Floor	118	60,000	0.0	6,000	12.8
38	F	Floor	42	60,000	0.0	6,000	11.1
39	F	Floor	-203	60,000	0.0	6,000	0.0
40	F	Floor	76	60,000	5.5	6,000	8.6
Average	F	Floor	2,544		11.6		15.6
Standard Deviation	F	Floor	9,332		14.9		16.5
Maximum	F	Floor	47,560		56.5		67.8

**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

EaglePicher FSS Data Sheet
Survey Unit 001
West Building

Detector Type	Detector SN	Detector (cm ²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 43-68 (beta)	095523	126	9/30/10	2350-1	80502	9/30/10
Ludlum 43-68 (beta)	119337	126	9/30/10	2350-1	95359	9/30/10
Packard Tri-Carb B2555	401863	NA	Daily	NA	NA	NA

Survey Point	Loc.*		Beta		H-3		C-14
			Fixed Reading (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)
1	C	Ceiling	1,317	60,000	0.0	6,000	1.9
2	C	Ceiling	559	60,000	2.2	6,000	4.2
3	C	Ceiling	2,923	60,000	22.3	6,000	11.9
4	C	Ceiling	2,692	60,000	11.1	6,000	2.5
5	C	Ceiling	2,669	60,000	0.0	6,000	0.0
6	C	Ceiling	2,156	60,000	6.6	6,000	0.0
7	C	Ceiling	3,275	60,000	3.5	6,000	0.0
8	C	Ceiling	18,891	60,000	10.2	6,000	14.8
9	C	Ceiling	1,981	60,000	15.7	6,000	15.6
10	C	Ceiling	2,611	60,000	10.3	6,000	14.7
11	C	Ceiling	14,836	60,000	15.3	6,000	12.7
12	C	Ceiling	14,987	60,000	6.8	6,000	15.2
13	C	Ceiling	536	60,000	0.0	6,000	13.1
14	C	Ceiling	3,135	60,000	6.4	6,000	0.0
15	C	Ceiling	3,438	60,000	0.0	6,000	13.1
16	C	Ceiling	3,485	60,000	0.0	6,000	10.7
17	C	Ceiling	3,147	60,000	14.3	6,000	10.9
18	C	Ceiling	3,520	60,000	0.0	6,000	0.0
19	C	Ceiling	2,459	60,000	0.0	6,000	5.8
20	C	Ceiling	2,576	60,000	0.0	6,000	5.9
21	C	Ceiling	2,273	60,000	8.7	6,000	1.5
22	C	Ceiling	-350	60,000	6.7	6,000	0.0
23	C	Ceiling	3,112	60,000	9.5	6,000	0.0
24	C	Ceiling	-303	60,000	0.0	6,000	9.4
25	C	Ceiling	303	60,000	9.3	6,000	0.0
26	C	Ceiling	-221	60,000	17.5	6,000	0.9
27	C	Ceiling	-734	60,000	44.5	6,000	14.3
28	C	Ceiling	82	60,000	0.4	6,000	0.7
29	C	Ceiling	-1,177	60,000	28.3	6,000	13.8
30	C	Ceiling	-676	60,000	30.0	6,000	24.7
31	C	Ceiling	-105	60,000	18.6	6,000	6.9
32	C	Ceiling	-781	60,000	30.2	6,000	6.3
33	C	Ceiling	-629	60,000	21.7	6,000	14.2
34	C	Ceiling	-664	60,000	13.8	6,000	4.9
35	C	Ceiling	-431	60,000	29.7	6,000	7.6
36	C	Ceiling	-280	60,000	11.6	6,000	18.5
37	C	Ceiling	-233	60,000	14.0	6,000	3.6
38	C	Ceiling	-47	60,000	3.5	6,000	0.0
39	C	Ceiling	-82	60,000	11.2	6,000	26.6
40	C	Ceiling	210	60,000	14.7	6,000	1.1
Average	C	Ceiling	2,262		11.2		7.7
Standard Deviation	C	Ceiling	4,346		10.6		7.2
Maximum	C	Ceiling	18,891		44.5		26.6

Final Status Survey Report for EaglePicher, Lenexa, Kansas

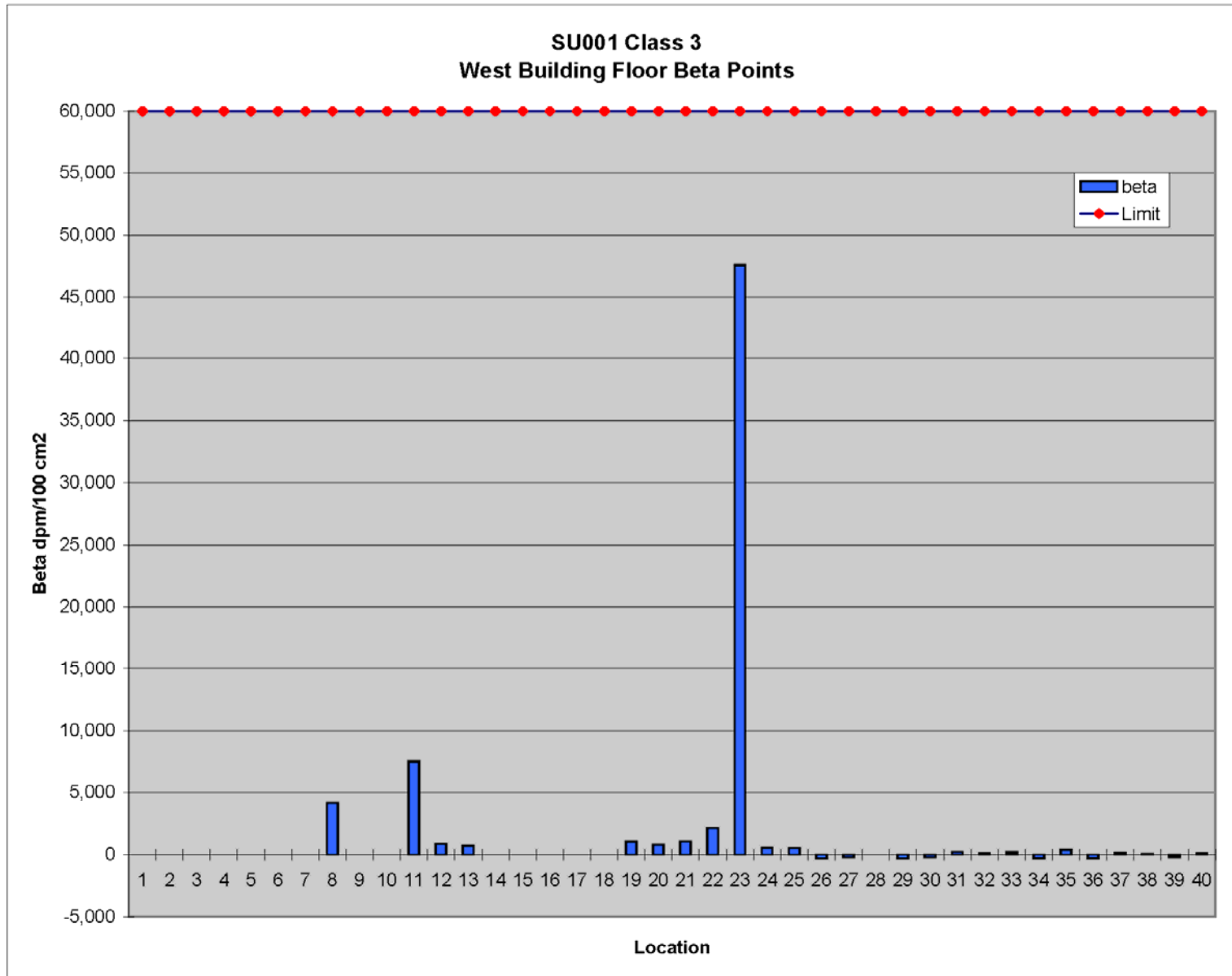
CS-HP-PN-018
Revision 1

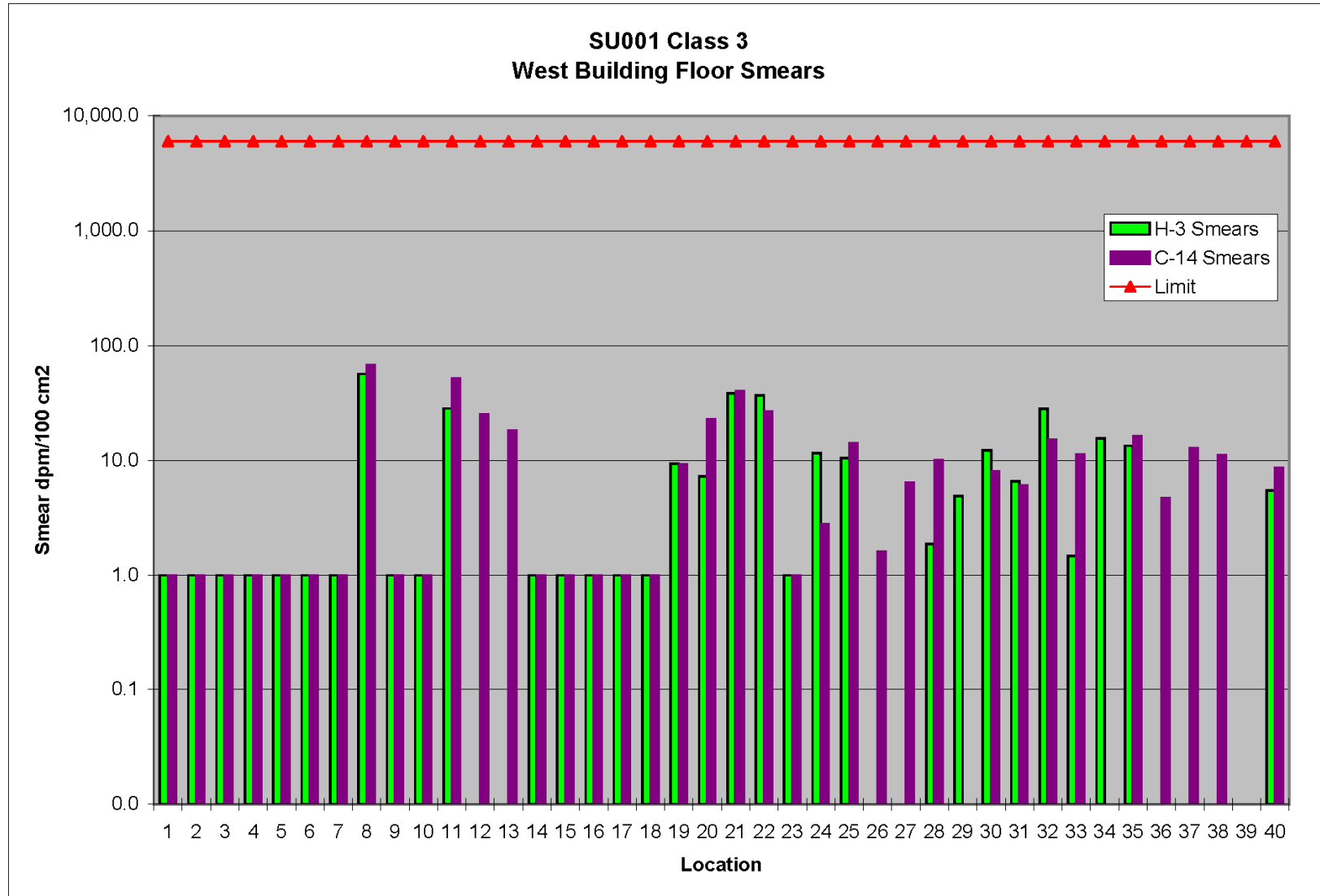
EaglePicher FSS Data Sheet
Survey Unit 001
West Building

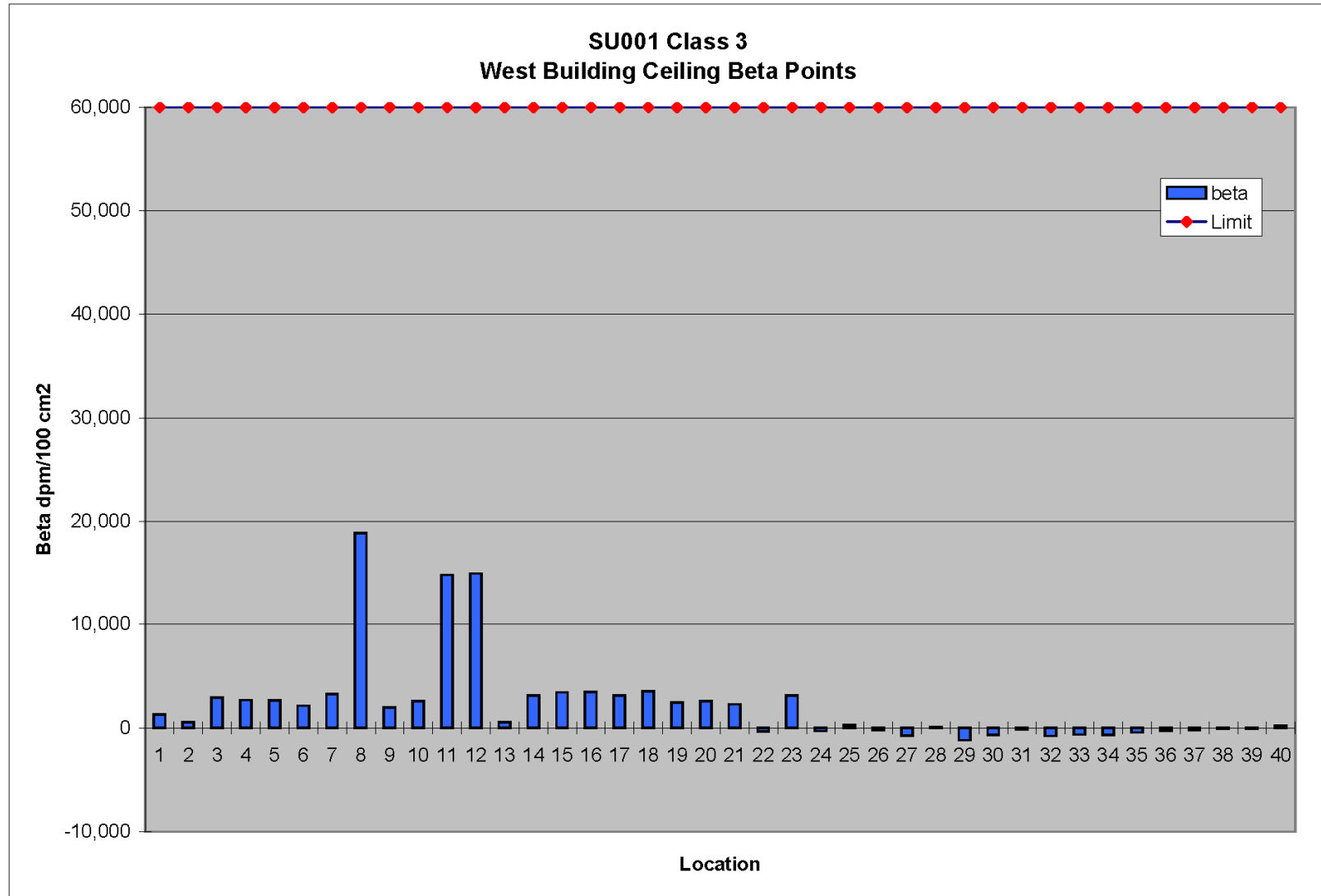
Detector Type	Detector SN	Detector	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 43-68 (beta)	095523	126	9/30/10	2350-1	80502	9/30/10
Ludlum 43-68 (beta)	119337	126	9/30/10	2350-1	95359	9/30/10
Packard Tri-Carb B2555	401863	NA	Daily	NA	NA	NA

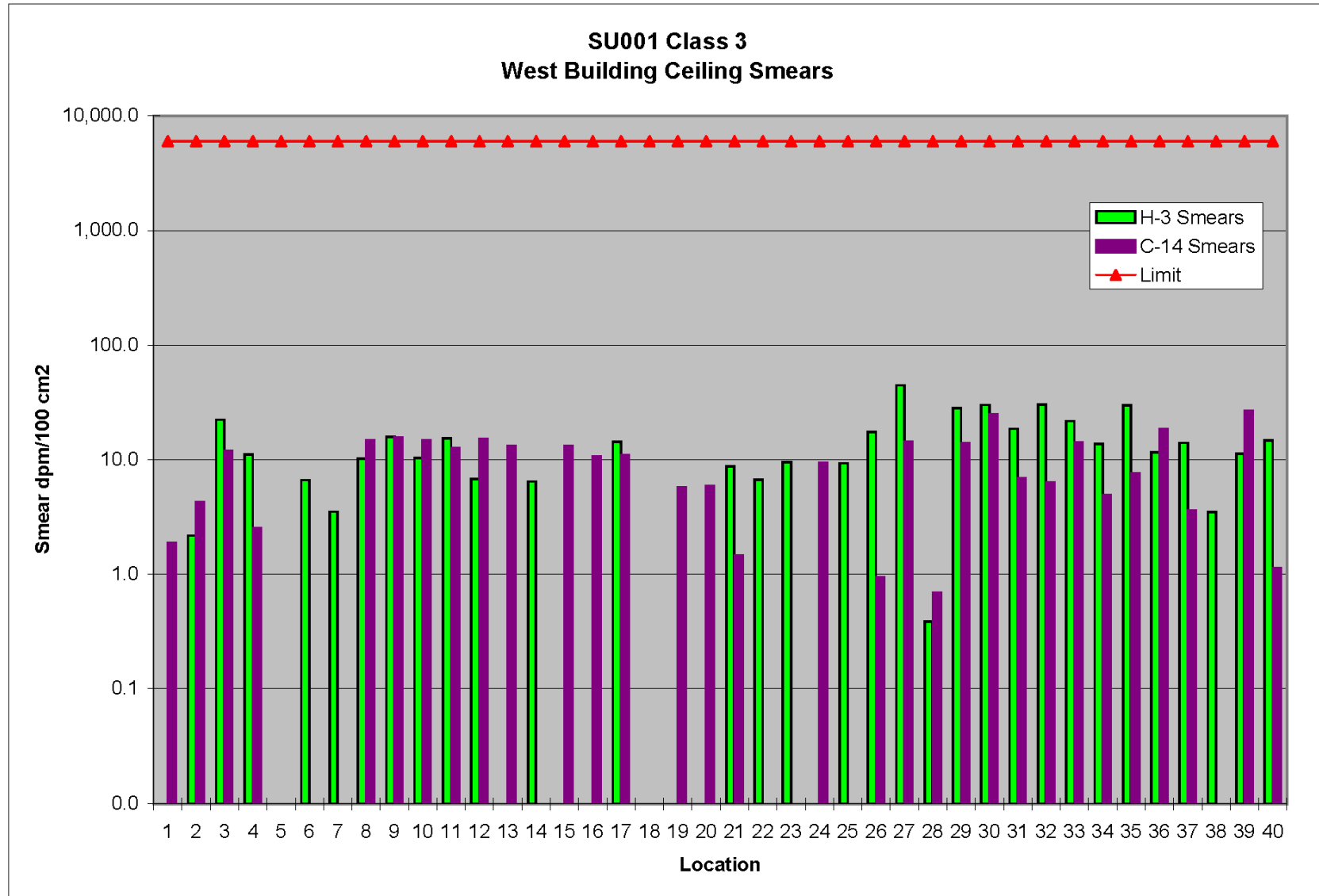
Survey Point	Loc.*		Beta		H-3		C-14
			Fixed Reading (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)
1	W	Walls	3,968	60,000	13.2	6,000	8.0
2	W	Walls	3,917	60,000	11.7	6,000	17.2
3	W	Walls	668	60,000	0.0	6,000	10.9
4	W	Walls	3,791	60,000	7.0	6,000	12.8
5	W	Walls	6,295	60,000	16.8	6,000	24.9
6	W	Walls	1,751	60,000	0.0	6,000	10.3
7	W	Walls	4,273	60,000	16.7	6,000	11.0
8	W	Walls	-42	60,000	9.3	6,000	32.7
9	W	Walls	17,227	60,000	0.0	6,000	7.1
10	W	Walls	2,691	60,000	19.1	6,000	1.8
11	W	Walls	10,796	60,000	0.8	6,000	12.9
12	W	Walls	313	60,000	10.1	6,000	2.2
13	W	Walls	-85	60,000	0.0	6,000	4.6
14	W	Walls	To Radwaste	60,000	To Radwaste	6,000	To Radwaste
15	W	Walls	To Radwaste	60,000	To Radwaste	6,000	To Radwaste
16	W	Walls	To Radwaste	60,000	To Radwaste	6,000	To Radwaste
17	W	Walls	To Radwaste	60,000	To Radwaste	6,000	To Radwaste
18	W	Walls	To Radwaste	60,000	To Radwaste	6,000	To Radwaste
19	W	Walls	821	60,000	0.0	6,000	4.6
20	W	Walls	491	60,000	0.0	6,000	2.1
21	W	Walls	2,022	60,000	0.0	6,000	0.0
22	W	Walls	1,354	60,000	89.4	6,000	8.9
23	W	Walls	5,314	60,000	NA	6,000	NA
24	W	Walls	-855	60,000	17.3	6,000	1.1
25	W	Walls	-1,667	60,000	2.4	6,000	3.1
26	W	Walls	-1,362	60,000	12.8	6,000	6.2
27	W	Walls	-1,523	60,000	0.0	6,000	4.6
28	W	Walls	-1,193	60,000	0.0	6,000	0.0
29	W	Walls	-1,075	60,000	18.5	6,000	2.4
30	W	Walls	-1,388	60,000	9.9	6,000	0.0
31	W	Walls	508	60,000	12.6	6,000	8.7
32	W	Walls	-1,548	60,000	11.2	6,000	3.9
33	W	Walls	347	60,000	5.3	6,000	12.8
34	W	Walls	-1,455	60,000	0.6	6,000	2.9
35	W	Walls	-1,091	60,000	3.3	6,000	7.1
36	W	Walls	-1,362	60,000	1.5	6,000	2.5
37	W	Walls	652	60,000	0.0	6,000	7.2
38	W	Walls	-1,176	60,000	7.3	6,000	6.6
39	W	Walls	212	60,000	0.0	6,000	7.1
40	W	Walls		60,000	0.0	6,000	2.1
Average			1,517		8.7		7.4
Standard Deviation			3,917		15.7		7.0
Maximum			17,227		89.4		32.7

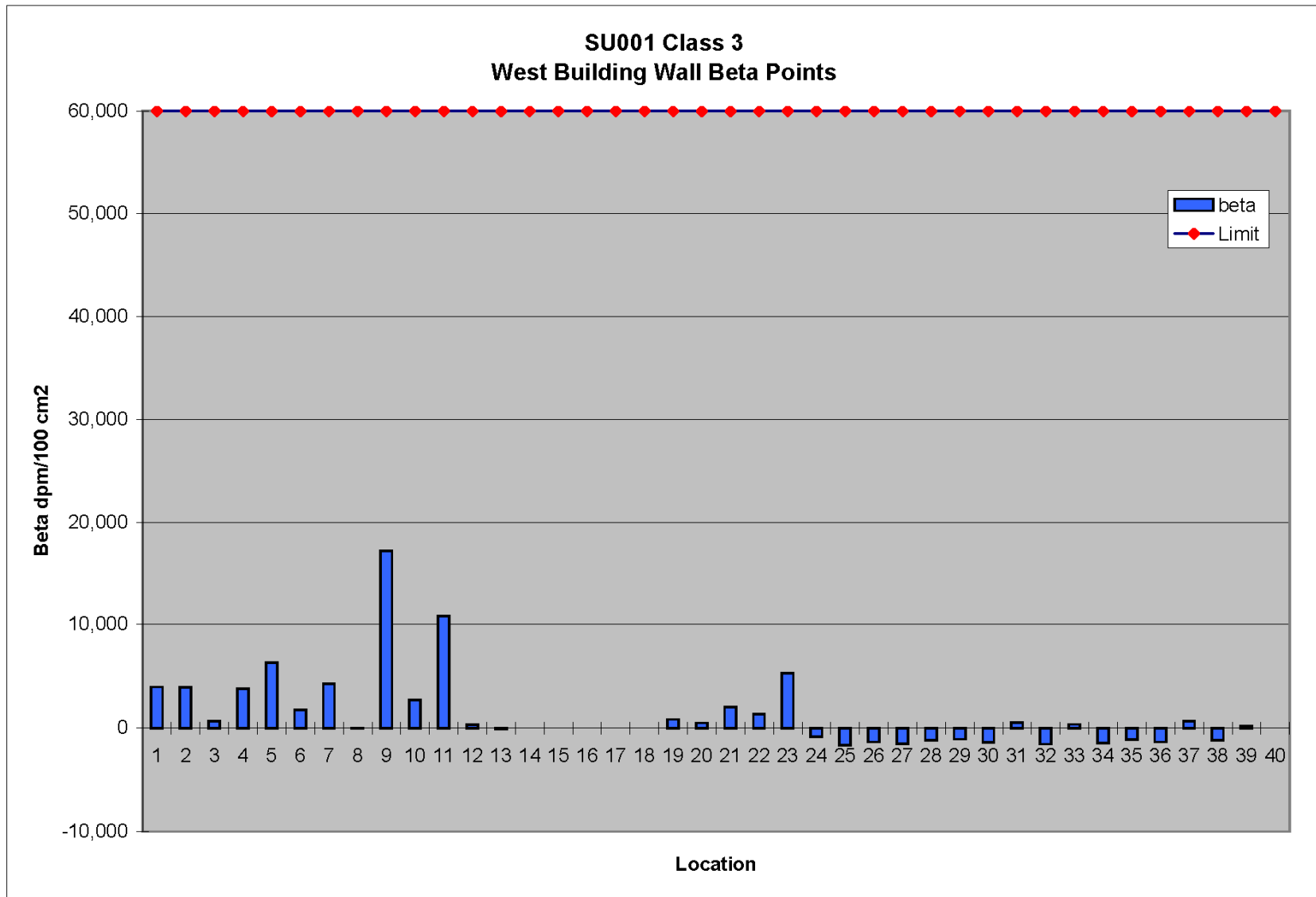
* R = Roof, F = Floor, W = Wall, C = Ceiling, E = Equipment

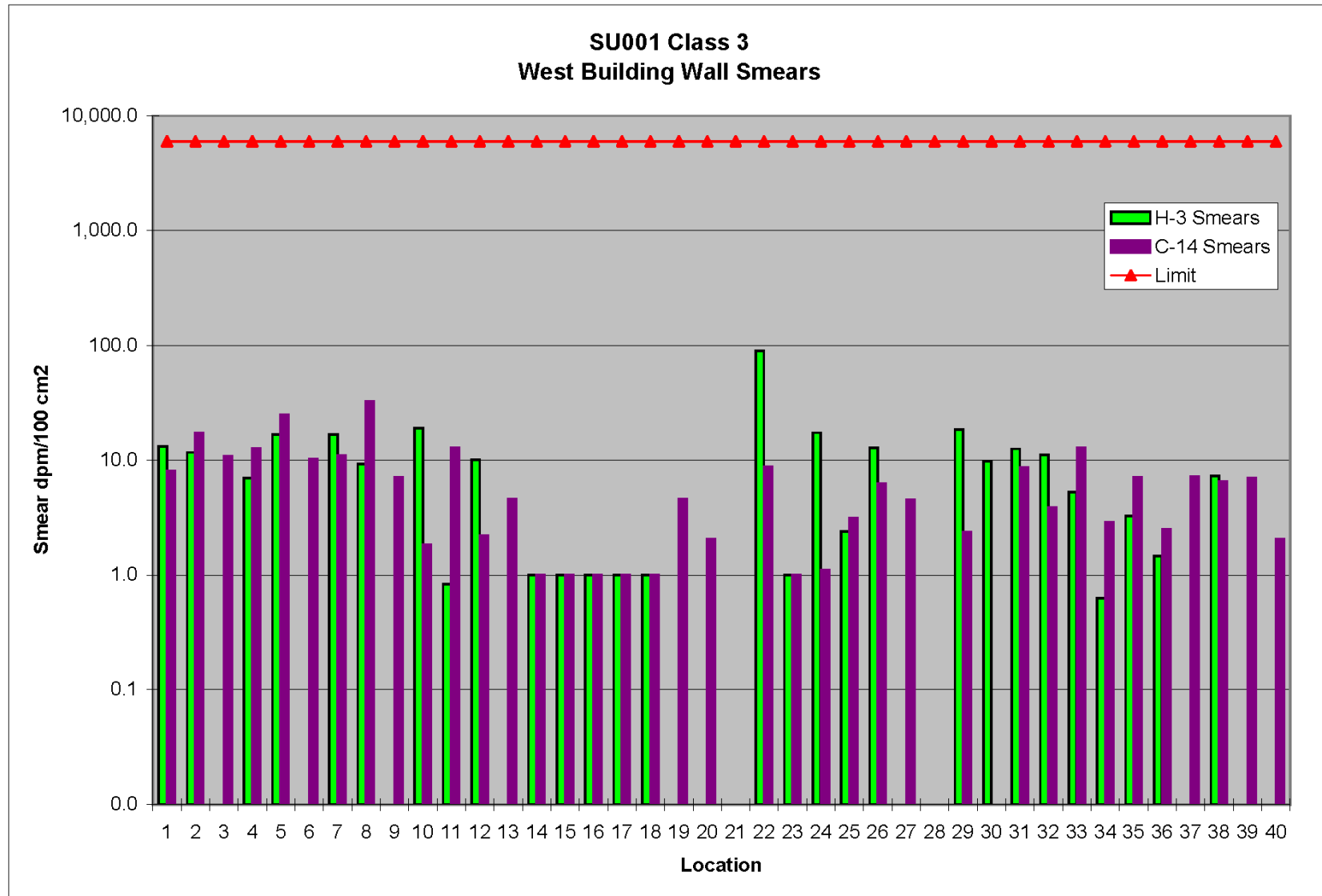














M2350-1 Download BETA Report

File Name : 00000031		Survey Description : SU001 Floor and Walls Points 1-13,22,24,25,26-38,3	
Survey Reason : Final Status			
User ID : RPS2366		Technician Name : Richard Stoney	
Instrument Model : 2350-1	Instrument S/N : 95359	Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b	Detector S/N : 119337	Detector Cal. Due : 9/30/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm2 Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0938	Survey Date : 10/26/2009	
Minimum Net DPM Observed: -2056	Mean Net DPM: 10284		
Maximum Net DPM Observed: 296756	STDEV Observed: 36487	# of Samples Taken: 69	

Richard Stoney
Print Name

Signature

Date

Print Name

Signature

Date

Comments:

Maximum reading of 7,408 dpm/100cm² on floor and
17,227 dpm/100cm² on wall.

Sign-Off

Paul Ely
Print Name

Paul Ely
Signature

11/2/09
Date

Page 1 of 3

Duratek Beta Survey Report

Download File Name: 00000031

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU01	F01	0	4,611.0	600	PRBBK	00	ZZZZZ	14	561	-845
SU01	F01	1	4,033.0	60	PRBBK	00	ZZZZZ	15	561	29,377
SU01	F01	2	3,826.0	600	PRBBK	00	ZZZZZ	16	561	-1,509
SU01	F01	3	4,024.0	60	PRBBK	00	ZZZZZ	17	561	29,301
SU01	F01	4	3,483.0	600	PRBBK	00	ZZZZZ	18	561	-1,800
SU01	F01	5	4,020.0	60	PRBBK	00	ZZZZZ	19	561	29,287
SU01	F01	6	3,952.0	60	PRBBK	00	ZZZZZ	20	561	28,692
SU01	F01	7	1,375.0	60	PRBBK	00	ZZZZZ	21	561	6,887
SU01	F01	8	4,016.0	60	PRBBK	00	ZZZZZ	22	561	29,233
SU01	F01	9	4,301.0	60	PRBBK	00	ZZZZZ	23	561	31,645
SU01	FL01	10	561.0	61	FLDBK	B0002	ZZZZZ	1	561	-1,231
SU01	FL01	11	799.0	60	FLDCT	B0002	ZZZZZ	1	561	2,014
SU01	FL01	12	1,210.0	60	FLDCT	B0002	ZZZZZ	1	561	5,491
SU01	FL01	13	1,335.0	60	FLDCT	B0002	ZZZZZ	3	561	6,549
SU01	FL01	14	1,251.0	60	FLDCT	B0002	ZZZZZ	3	561	5,838
SU01	FL01	15	1,231.0	60	FLDCT	B0002	ZZZZZ	4	561	5,868
SU01	W01	16	1,030.0	60	FLDCT	B0004	ZZZZZ	1	561	3,988
SU01	W01	17	1,024.0	60	FLDCT	B0004	ZZZZZ	2	561	3,917
SU01	W01	18	640.0	60	FLDCT	B0004	ZZZZZ	3	561	868
SU01	W01	19	1,009.0	60	FLDCT	B0004	ZZZZZ	4	561	3,791
SU01	W01	20	1,305.0	60	FLDCT	B0004	ZZZZZ	5	561	6,295
SU01	FL01	21	2,062.0	60	FLDCT	B0002	ZZZZZ	5	561	12,700
SU01	FL01	22	35,634.0	60	FLDCT	B0002	ZZZZZ	6	561	296,756
SU01	FL01	23	4,421.0	60	FLDCT	B0002	ZZZZZ	7	561	32,680
SU01	W01	24	788.0	60	FLDCT	B0004	ZZZZZ	6	561	1,751
SU01	W01	25	1,066.0	60	FLDCT	B0004	ZZZZZ	7	561	4,273
SU01	W01	26	556.0	60	FLDCT	B0004	ZZZZZ	8	561	-42
SU01	FL01	27	1,052.0	60	FLDCT	B0002	ZZZZZ	8	561	4,154
SU01	FL01	28	548.0	60	FLDBK	B0002	ZZZZZ	9	561	-110
SU01	FL01	29	2,257.0	60	FLDBK	B0002	ZZZZZ	9	561	14,350
SU01	FL01	30	2,020.0	60	FLDCT	B0002	ZZZZZ	9	561	12,345
SU01	FL01	31	1,820.0	60	FLDCT	B0002	ZZZZZ	10	561	10,653
SU01	FL01	32	1,446.0	60	FLDCT	B0002	ZZZZZ	11	561	7,488
SU01	W01	33	1,837.0	60	FLDCT	B0004	ZZZZZ	11	561	10,796
SU01	W01	34	2,597.0	60	FLDCT	B0004	ZZZZZ	9	561	17,227
SU01	W01	35	879.0	60	FLDCT	B0004	ZZZZZ	10	561	2,891
SU01	FL01	36	491.0	60	FLDBK	B0004	ZZZZZ	12	561	-592
SU01	FL01	37	661.0	60	FLDCT	B0002	ZZZZZ	12	561	846
SU01	FL01	38	646.0	60	FLDCT	B0002	ZZZZZ	13	561	719

Beta Flag

45000 -

Beta Max Flag

60000

Monday, November 02, 2009

Page 2 of 3

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU01	W01	39	551.0	60	FLDCT	B0004	ZZZZZ	13	561	-85
SU01	W01	40	598.0	60	FLDCT	B0004	ZZZZZ	12	561	313
SU01	W01	41	721.0	60	FLDCT	B0004	ZZZZZ	22	561	1,354
SU01	FL01	42	813.0	60	FLDCT	B0002	ZZZZZ	22	561	2,132
SU01	FL01	43	519.0	60	FLDBK	B0002	ZZZZZ	22	561	-355
SU01	FL01	44	628.0	60	FLDCT	B0002	ZZZZZ	24	561	567
SU01	W01	45	460.0	60	FLDCT	B0004	ZZZZZ	24	561	-855
SU01	FL01	46	824.0	60	FLDCT	B0002	ZZZZZ	25	561	533
SU01	W01	47	364.0	60	FLDCT	B0004	ZZZZZ	25	561	-1,067
SU01	FL01	48	524.0	60	FLDCT	B0002	ZZZZZ	26	561	-313
SU01	FL01	49	535.0	60	FLDCT	B0002	ZZZZZ	27	561	-220
SU01	FL01	50	561.0	60	FLDCT	B0002	ZZZZZ	28	561	0
SU01	FL01	51	522.0	60	FLDCT	B0002	ZZZZZ	29	561	-330
SU01	FL01	52	536.0	60	FLDCT	B0002	ZZZZZ	30	561	-212
SU01	FL01	53	586.0	60	FLDCT	B0002	ZZZZZ	31	561	212
SU01	FL01	54	572.0	60	FLDCT	B0002	ZZZZZ	32	561	93
SU01	FL01	55	582.0	60	FLDCT	B0002	ZZZZZ	33	561	178
SU01	FL01	56	525.0	60	FLDCT	B0002	ZZZZZ	34	561	-305
SU01	FL01	57	608.0	60	FLDCT	B0002	ZZZZZ	35	561	398
SU01	FL01	58	527.0	60	FLDCT	B0002	ZZZZZ	36	561	-268
SU01	FL01	59	575.0	60	FLDCT	B0002	ZZZZZ	37	561	118
SU01	FL01	60	566.0	60	FLDCT	B0002	ZZZZZ	38	561	42
SU01	FL01	61	537.0	60	FLDCT	B0002	ZZZZZ	39	561	-203
SU01	FL01	62	570.0	60	FLDCT	B0002	ZZZZZ	40	561	76
SU01	FL01	63	474.0	60	FLDBK	B0002	ZZZZZ	0	561	-736
SU01	W01	64	318.0	60	FLDBK	B0004	ZZZZZ	40	561	-2,056
SU01	W01	65	348.0	60	FLDBK	B0004	ZZZZZ	39	561	-1,802
SU01	W01	66	3,462.0	600	PTBBK	B0004	ZZZZZ	40	561	-1,817
SU01	XXX	67	4,137.0	60	PTSC1	B0004	ZZZZZ	0	561	30,257
SU01	XXX	68	4,420.0	60	PTSC1	B0004	ZZZZZ	1	561	32,851

Beta Flag 45000 ~
Beta Max Flag 60000

Monday, November 02, 2009

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M2350-1 Download BETA Report

File Name : 00000036		Survey Description : SU01F Ceiling Points 1-40	
Survey Reason : Final Status			
User ID : SXM1098		Technician Name : Sharon McChesney	
Instrument Model : 2350-1	Instrument S/N : 80502	Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b	Detector S/N : 095523	Detector Cal. Due : 9/30/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm2 Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0881	Survey Date : 10/27/2009	
Minimum Net DPM Observed: -1177	Mean Net DPM: 3107		
Maximum Net DPM Observed: 44705	STDEV Observed: 7493	# of Samples Taken: 48	

Sharon McChesney
Print Name

Sharon McChesney
Signature

10-27-09
Date

Print Name

Signature

Date

Comments:

Maximum scan reading of 2200 cpm. (ceiling)

Sign-Off

Paul Ely
Print Name

Paul Ely
Signature

10/29/09
Date

Page 1 of 3

Duratek Beta Survey Report

Download File Name: 00000036

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU01F	C01	0	422.0	60	FLDBK	B0012	ZZZZZ	1	392	350
SU01F	C01	1	2,013.0	60	FLDCT	B0012	ZZZZZ	8	392	18,891
SU01F	C01	2	1,678.0	60	FLDCT	B0012	ZZZZZ	12	392	14,987
SU01F	C01	3	438.0	60	FLDCT	B0012	ZZZZZ	13	392	538
SU01F	C01	4	399.0	60	FLDCT	B0012	ZZZZZ	28	392	82
SU01F	C01	5	383.0	60	FLDCT	B0012	ZZZZZ	31	392	-105
SU01F	C01	6	373.0	60	FLDCT	B0012	ZZZZZ	26	392	-221
SU01F	C01	7	329.0	60	FLDCT	B0012	ZZZZZ	27	392	-734
SU01F	C01	8	291.0	60	FLDCT	B0012	ZZZZZ	29	392	-1,177
SU01F	C01	9	334.0	60	FLDCT	B0012	ZZZZZ	30	392	-676
SU01F	C01	10	325.0	60	FLDCT	B0012	ZZZZZ	32	392	-781
SU01F	C01	11	335.0	60	FLDCT	B0012	ZZZZZ	34	392	-664
SU01F	C01	12	355.0	60	FLDCT	B0012	ZZZZZ	35	392	-431
SU01F	C01	13	338.0	60	FLDCT	B0012	ZZZZZ	33	392	-629
SU01F	C01	14	372.0	60	FLDCT	B0012	ZZZZZ	37	392	-233
SU01F	C01	15	385.0	60	FLDCT	B0012	ZZZZZ	39	392	-82
SU01F	C01	16	410.0	60	FLDCT	B0012	ZZZZZ	40	392	210
SU01F	C01	17	388.0	60	FLDCT	B0012	ZZZZZ	38	392	-47
SU01F	C01	18	368.0	60	FLDCT	B0012	ZZZZZ	36	392	-260
SU01F	C01	19	362.0	60	FLDCT	B0012	ZZZZZ	22	392	-350
SU01F	C01	20	398.0	60	FLDBK	B0012	ZZZZZ	2	392	70
SU01F	C01	21	366.0	60	FLDCT	B0012	ZZZZZ	24	392	-303
SU01F	C01	22	418.0	60	FLDCT	B0012	ZZZZZ	25	392	303
SU01F	C01	23	603.0	60	FLDCT	B0012	ZZZZZ	19	392	2,459
SU01F	C01	24	613.0	60	FLDCT	B0012	ZZZZZ	20	392	2,576
SU01F	C01	25	587.0	60	FLDCT	B0012	ZZZZZ	21	392	2,273
SU01F	C01	26	1,665.0	60	FLDCT	B0012	ZZZZZ	11	392	14,836
SU01F	C01	27	616.0	60	FLDCT	B0012	ZZZZZ	10	392	2,611
SU01F	C01	28	562.0	60	FLDCT	B0012	ZZZZZ	9	392	1,981
SU01F	C01	29	621.0	60	FLDCT	B0012	ZZZZZ	5	392	2,669
SU01F	C01	30	505.0	60	FLDCT	B0012	ZZZZZ	1	392	1,317
SU01F	C01	31	440.0	60	FLDCT	B0012	ZZZZZ	2	392	559
SU01F	C01	32	643.0	60	FLDCT	B0012	ZZZZZ	3	392	2,925
SU01F	C01	33	577.0	60	FLDCT	B0012	ZZZZZ	6	392	2,156
SU01F	C01	34	623.0	60	FLDCT	B0012	ZZZZZ	4	392	2,692
SU01F	C01	35	673.0	60	FLDCT	B0012	ZZZZZ	7	392	3,275
SU01F	C01	36	659.0	60	FLDCT	B0012	ZZZZZ	23	392	3,112
SU01F	C01	37	661.0	60	FLDCT	B0012	ZZZZZ	14	392	3,135
SU01F	C01	38	687.0	60	FLDCT	B0012	ZZZZZ	15	392	3,438

Beta Flag 45000 -
Beta Max Flag 60000

Wednesday, October 28, 2009

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Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU01F	C01	39	694.0	60	FLDCT	B0012	ZZZZZ	18	392	3,520
SU01F	C01	40	662.0	60	FLDCT	B0012	ZZZZZ	17	392	3,147
SU01F	C01	41	691.0	60	FLDCT	B0012	ZZZZZ	16	392	3,485
SU01F	C01	42	356.0	60	FLDBK	B0012	ZZZZZ	3	392	-420
ZZZZZ	ZZZZZ	43	3,620.0	600	PTBBK	B9999	ZZZZZ	1	0	4,219
ZZZZZ	ZZZZZ	44	3,836.0	60	PTSC1	B9999	ZZZZZ	1	0	44,705
ZZZZZ	ZZZZZ	45	3,042.0	600	PTBBK	B9999	ZZZZZ	2	0	3,545

Beta Flag 45000 -
Beta Max Flag 60000

Wednesday, October 28, 2009

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M2350-1 Download BETA Report

File Name : 00000037		Survey Description : SU001 Floor and Walls 14-21,23 Walls only 26-38	
Survey Reason : Final Status			
User ID : RPS2366		Technician Name : Richard Stoney	
Instrument Model : 2350-1	Instrument S/N : 95359	Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b	Detector S/N : 119337	Detector Cal. Due : 9/30/2010	
Measurement Type : BETA		Detector Type : 02200 : 126 cm ² Gas Proportional Detector	
Detector Area : 126	Efficiency : 0.0938	Survey Date : 10/27/2009	
Minimum Net DPM Observed: -1548	Mean Net DPM: 8610		
Maximum Net DPM Observed: 62282	STDEV Observed: 15226	# of Samples Taken: 51	

Richard Stoney
Print Name

Signature

Date

Print Name

Signature

Date

Comments:

Maximum reading of 47,560 dpm/100 cm² on floor and
5,314 dpm/100 cm² on wall.

Sign-Off

Print Name

Signature

Date

Page 1 of 3

Duratek Beta Survey Report

Download File Name: 00000037

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU001	W01	0	4,129.0	60	PRSC1	B0004	ZZZZZ	2	484	30,841
SU001	W01	1	3,257.0	600	PRBBK	B0004	ZZZZZ	3	484	-1,339
SU001	W01	2	3,923.0	60	PRSC1	B0004	ZZZZZ	1	484	29,098
SU001	W01	3	4,172.0	60	PRSC1	B0004	ZZZZZ	2	484	31,205
SU001	W01	4	344.0	60	PRSC1	B0004	ZZZZZ	3	484	-1,185
SU001	W01	5	352.0	60	FLDBK	B0004	ZZZZZ	1	484	-1,117
SU001	W01	6	3,457.0	600	PTBBK	B0004	ZZZZZ	0	484	-1,170
SU001	W01	7	3,286.0	600	PRBBK	B0004	ZZZZZ	0	484	-1,315
SU001	W01	8	4,097.0	60	PRSC1	B0004	ZZZZZ	1	484	30,570
SU001	W01	9	948.0	60	PRSC1	B0004	ZZZZZ	2	484	3,926
SU001	W01	10	3,989.0	60	PRSC1	B0004	ZZZZZ	3	484	29,487
SU001	W01	11	4,062.0	60	PRSC1	B0004	ZZZZZ	4	484	30,274
SU001	W01	12	3,998.0	60	PRSC1	B0004	ZZZZZ	5	484	29,715
SU001	W01	13	4,278.0	60	PRSC1	B0004	ZZZZZ	6	484	32,084
SU001	FL01	14	416.0	60	FLDBK	B0002	ZZZZZ	23	484	-575
SU001	FL01	15	6,105.0	60	FLDCT	B0002	ZZZZZ	23	484	47,560
SU001	W01	16	1,112.0	60	FLDCT	B0004	ZZZZZ	23	484	5,314
SU001	W01	17	544.0	60	FLDCT	B0004	ZZZZZ	31	484	508
SU001	W01	18	525.0	60	FLDCT	B0004	ZZZZZ	33	484	347
SU001	W01	19	508.0	60	FLDCT	B0004	ZZZZZ	39	484	212
SU001	W01	20	561.0	60	FLDCT	B0004	ZZZZZ	37	484	652
SU001	W01	21	345.0	60	FLDCT	B0004	ZZZZZ	38	484	-1,176
SU001	W01	22	355.0	60	FLDCT	B0004	ZZZZZ	35	484	-1,091
SU001	FL01	23	446.0	60	FLDBK	B0002	ZZZZZ	38	484	-322
SU001	W01	24	323.0	60	FLDCT	B0004	ZZZZZ	36	484	-1,382
SU001	W01	25	343.0	60	FLDCT	B0004	ZZZZZ	28	484	-1,193
SU001	W01	26	581.0	60	FLDCT	B0004	ZZZZZ	19	484	821
SU001	W01	27	542.0	60	FLDCT	B0004	ZZZZZ	20	484	491
SU001	FL01	28	606.0	60	FLDCT	B0002	ZZZZZ	19	484	1,032
SU001	FL01	29	579.0	60	FLDCT	B0002	ZZZZZ	20	484	804
SU001	FL01	30	484.0	60	FLDBK	B0002	ZZZZZ	20	484	0
SU001	FL01	31	610.0	60	FLDCT	B0002	ZZZZZ	21	484	1,066
SU001	W01	32	723.0	60	FLDCT	B0004	ZZZZZ	21	484	2,022
SU001	W01	33	301.0	60	FLDCT	B0004	ZZZZZ	32	484	-1,548
SU001	W01	34	312.0	60	FLDCT	B0004	ZZZZZ	34	484	-1,455
SU001	W01	35	328.0	60	FLDCT	B0004	ZZZZZ	26	484	-1,362
SU001	W01	36	304.0	60	FLDCT	B0004	ZZZZZ	27	484	-1,523
SU001	W01	37	357.0	60	FLDCT	B0004	ZZZZZ	29	484	-1,075
SU001	W01	38	320.0	60	FLDCT	B0004	ZZZZZ	30	484	-1,388

OK as is
PRSC1
7054644
10/29/09

Beta Flag

45000 -

Beta Max Flag

60000

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Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU001	FL01	40	484.0	60	FLDBK	B0002	ZZZZZ	14	484	0
SU001	FL01	41	707.0	60	FLDCT	B0002	ZZZZZ	14	484	1,887
SU001	FL01	42	802.0	60	FLDCT	B0002	ZZZZZ	15	484	2,691
SU001	FL01	43	784.0	60	FLDCT	B0002	ZZZZZ	16	484	2,538
SU001	FL01	44	688.0	60	FLDCT	B0002	ZZZZZ	17	484	1,726
SU001	FL01	45	1,009.0	60	FLDCT	B0002	ZZZZZ	18	484	4,442
SU001	W01	46	7,845.0	60	FLDCT	B0004	ZZZZZ	14	484	62,282
SU001	W01	47	4,036.0	60	FLDCT	B0004	ZZZZZ	15	484	30,054
SU001	W01	48	2,619.0	60	FLDCT	B0004	ZZZZZ	16	484	18,064
SU001	W01	49	1,338.0	60	FLDCT	B0004	ZZZZZ	17	484	7,226
SU001	W01	50	2,927.0	60	FLDCT	B0004	ZZZZZ	18	484	20,670
SU001	FL01	51	450.0	60	FLDBK	B0002	ZZZZZ	18	484	-288

to su012

will to radwaste

Beta Flag 45000 -
Beta Max Flag 60000

Wednesday, October 28, 2009

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**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

25 Oct 2009 13:24 ALPHA/BETA - 1.09 Page #1
Protocol #:25 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Low Energy: 3H
Background Subtract: 1st Vial High Energy: 14C

	LL	UL	LCR	2S%	BKG
Region A:	0.0 - 12.0		0	0.0	9.27
Region B:	12.0 - 156		0	0.0	16.73
Region C:	0.0 - 0.0		0	0.0	0.00

Quench Indicator: tsIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA25.DAT

P#	PID	S#	SMPL_ID	TIME	H-3 CPMA A:2S%	C-14 CPMB B:2S%	H-3 DPM1	C-14 DPM2	tsIE	FLAG
25	2	1		10.00	9.27 20.77	16.73 15.46			426.52	B
25	2	2	SU1 F1	1.00	2.73 263.5	9.27 113.5	5.19	11.19	366.57	
25	2	3	SU1 F2	1.00	42.98 33.93	94.02 22.55	103.57	110.65	373.96	
25	2	4	SU1 F3	1.00	14.36 69.01	49.64 33.24	22.71	59.46	431.56	
25	2	5	SU1 F4	1.00	59.55 28.05	137.45 18.17	137.63	162.13	381.00	
25	2	6	SU1 F5	1.00	85.22 22.92	156.78 16.88	192.60	181.35	425.41	
25	2	7	SU1 F6	1.00	36.34 37.54	188.66 15.25	37.26	230.46	380.66	
25	2	8	SU1 F7	1.00	249.76 12.91	618.50 8.16	578.04	734.49	368.27	
25	2	9	SU1 F8	1.00	27.04 45.13	57.96 30.15	56.50	67.75	437.85	
25	2	10	SU1 F9	1.00	25.37 47.02	88.63 23.35	41.07	106.31	417.17	
25	2	11	SU1 F10	1.00	41.70 34.55	113.30 20.26	83.95	134.46	402.45	
25	2	12	SU1 F11	1.00	14.78 67.62	43.22 36.33	28.35	51.48	403.77	
25	10	13	SU1 F12	1.00	0.00 0.00	20.19 61.54	0.00	25.22	398.76	
25	10	14	SU1 F13	1.00	0.00 0.00	14.27 80.11	0.00	18.34	295.84	
25	10	15	SU1 F19	1.00	4.04 186.7	7.96 129.0	9.32	9.25	407.35	
25	10	16	SU1 F20	1.00	4.87 159.4	19.04 64.26	7.26	22.96	405.78	
25	10	17	SU1 F21	1.00	16.61 62.33	34.39 42.26	38.52	40.15	397.27	
25	10	18	SU1 F22	1.00	14.57 68.32	23.43 55.21	36.87	26.82	395.17	
25	10	19	SU1 F24	1.00	4.22 179.8	2.78 331.5	11.58	2.77	425.22	
25	10	20	SU1 F25	1.00	5.04 154.9	11.96 92.14	10.51	14.08	416.80	
25	10	21	SU1 F26	1.00	0.00 0.00	1.27 698.0	0.00	1.60	371.35	
25	10	22	SU1 F27	1.00	0.00 0.00	5.14 188.7	0.00	6.42	408.45	
25	10	23	SU1 F28	1.00	1.73 399.5	8.27 124.9	1.88	10.03	417.34	
25	10	24	SU1 F29	1.00	1.73 399.5	0.00 0.00	4.91	0.00	463.48	
25	16	25	SU1 F30	1.00	4.89 158.8	7.11 142.1	12.26	8.05	409.95	
25	16	26	SU1 F31	1.00	2.78 239.0	5.22 186.3	6.56	6.05	405.00	
25	16	27	SU1 F32	1.00	10.41 87.21	13.59 83.24	28.22	15.23	387.97	
25	16	28	SU1 F33	1.00	1.73 399.5	9.27 113.5	1.47	11.28	414.49	
25	16	29	SU1 F34	1.00	5.30 148.6	0.70 1244	15.54	0.01	428.58	
25	16	30	SU1 F35	1.00	6.17 131.2	13.83 82.09	13.44	16.23	409.26	
25	16	31	SU1 F36	1.00	0.00 0.00	3.74 251.6	0.00	4.67	410.65	
25	16	32	SU1 F37	1.00	0.00 0.00	10.27 104.3	0.00	12.82	404.53	
25	16	33	SU1 F38	1.00	0.00 0.00	8.87 117.7	0.00	11.06	420.75	
25	16	34	SU1 F39	1.00	0.00 0.00	0.00 0.00	0.00	0.00	418.59	
25	16	35	SU1 F40	1.00	2.73 263.5	7.27 139.4	5.50	8.62	406.55	

Handwritten notes:
 - To Survey Unit 010 (bracketed next to rows 2-11)
 - Area to Radwaste (bracketed next to rows 12-19)
 - to Survey Unit 011 (bracketed next to row 20)

**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

26 Oct 2009 07:31 ALPHA/BETA - 1.09 Page #1
Protocol #:11 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Low Energy: 3H
High Energy: 14C
Background Subtract: 1st Vial

	LL	UL	LCR	2S%	BKG
Region A:	0.0 - 12.0	0	0.0	7.78	
Region B:	12.0 - 156	0	0.0	16.32	
Region C:	0.0 - 0.0	0	0.0	0.00	

Quench Indicator: tSTE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA11.DAT

P#	PID	S#	SMPL_ID	TIME	H-3 CPMA A:2S%	C-14 CPMB B:2S%	H-3 DPM1	C-14 DPM2	tSTE	FLAG
11	1	1		10.00	7.78 22.67	16.32 15.66			427.68	B
11	1	2	SU1 W1	1.00	8.22 99.71	0.00 0.00	24.79	0.00	424.12	
11	1	3	SU1 W2	1.00	5.09 145.1	0.00 0.00	15.42	0.00	422.61	
11	1	4	SU1 W3	1.00	0.00 0.00	0.00 0.00	0.00	0.00	418.58	
11	1	5	SU1 W4	1.00	5.63 133.8	7.27 138.2	14.11	8.13	421.55	
11	1	6	SU1 W5	1.00	220.30 13.73	159.60 16.70	638.54	162.03	397.35	
11	1	7	SU1 W6	1.00	0.69 882.7	3.36 274.6	0.71	4.08	424.25	
11	1	8	SU1 W7	1.00	3.84 183.3	10.06 105.2	7.38	11.89	431.31	
11	1	9	SU1 W8	1.00	6.78 115.5	27.12 49.50	9.28	32.67	428.20	
11	1	10	SU1 W9	1.00	0.00 0.00	5.68 171.1	0.00	7.08	423.09	
11	1	11	SU1 W10	1.00	6.56 116.6	2.34 384.6	19.09	1.84	418.20	
11	1	12	SU1 W11	1.00	1.71 375.7	10.56 101.1	0.83	12.87	424.98	
11	2	13	SU1 W12	1.00	3.65 191.6	2.25 399.1	10.13	2.21	422.35	
11	2	14	SU1 W13	1.00	0.00 0.00	3.68 252.5	0.00	4.59	427.65	
11	2	15	SU1 W19	1.00	0.00 0.00	3.68 252.5	0.00	4.59	428.14	
11	2	16	SU1 W20	1.00	0.22 2743	1.68 526.2	0.00	2.06	431.62	
11	2	17	SU1 W21	1.00	0.00 0.00	0.00 0.00	0.00	0.00	428.94	
11	2	18	SU1 W22	1.00	32.67 39.31	11.23 96.20	89.44	8.85	455.29	
11	2	19	SU1 W24	1.00	6.22 123.7	1.68 526.2	17.33	1.11	449.75	
11	2	20	SU1 W25	1.00	1.22 514.3	2.68 338.5	2.40	3.14	465.79	
11	2	21	SU1 W26	1.00	5.22 142.3	5.68 171.1	12.81	6.24	452.25	
11	2	22	SU1 W27	1.00	0.22 2743	3.68 252.5	0.00	4.56	419.90	
11	2	23	SU1 W28	1.00	0.00 0.00	0.00 0.00	0.00	0.00	420.41	
11	2	24	SU1 W29	1.00	6.16 124.6	2.74 332.1	18.48	2.38	400.02	
11	3	25	SU1 W30	1.00	3.22 213.4	0.00 0.00	9.86	0.00	417.20	
11	3	26	SU1 W31	1.00	5.22 142.3	7.68 131.8	12.57	8.72	425.35	
11	3	27	SU1 W32	1.00	4.22 169.6	3.68 252.5	11.17	3.90	426.06	
11	3	28	SU1 W33	1.00	3.22 213.4	10.58 100.2	5.30	12.78	427.35	
11	3	29	SU1 W34	1.00	0.53 1147	2.37 379.7	0.63	2.87	416.75	
11	3	30	SU1 W35	1.00	1.91 338.6	5.99 163.4	3.26	7.14	434.43	
11	3	31	SU1 W36	1.00	0.78 786.2	2.12 422.1	1.46	2.52	428.27	
11	3	32	SU1 W37	1.00	0.00 0.00	5.80 167.9	0.00	7.23	422.72	
11	3	33	SU1 W38	1.00	3.22 213.4	5.68 171.1	7.31	6.55	428.46	
11	3	34	SU1 W39	1.00	0.22 2743	5.68 171.1	0.00	7.05	423.41	
11	3	35	SU1 W40	1.00	0.22 2743	1.68 526.2	0.00	2.06	426.31	

These samples not used. A
resurvey was performed on
Nov 2, 2009.

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02 Nov 2009 11:21 ALPHA/BETA - 1.09 *SU001* Page #1
 Protocol #: 2 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
 Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
 Low Energy: 3H
 High Energy: 14C
 Background Subtract: 1st Vial

	LL	UL	LCR	2S%	BKG
Region A:	0.0 - 12.0		0	0.0	12.16
Region B:	12.0 - 156		0	0.0	14.24
Region C:	0.0 - 0.0		0	0.0	0.00

Quench Indicator: tSIE/AEC
 Ext Std Terminator: Count
 FSS Smears in 20 ml Ultima Gold
 Coincidence Time(ns): 18
 Delay Before Burst(ns): Normal
 Protocol Data Filename: C:\EP\PROT.DAT
 Count Data Filename: C:\EP\SDATA2.002

*Will resurvey for points
 W-1 to W-7*

P#	PID	S#	SMPL_ID	TIME	CPMAA:2S%	CPMBB:2S%	3H-DPM	14C-DPM	tSIE	FLAG
2	1	1		10.0	12.2 18.1	14.2 16.8	0.00	0.00	396	B
2	1	2	SU001 W-1	1.0	5.4 159	7.2 133	13.15	8.03	439	
2	1	3	SU001 W-2	1.0	5.8 150	13.8 78.9	11.72	16.17	438	
2	1	4	SU001 W-3	1.0	0.0 0.0	8.8 113	0.00	10.90	433	
2	1	5	SU001 W-4	1.0	3.8 216	10.8 95.6	7.03	12.76	438	
2	1	6	SU001 W-5	1.0	8.5 110	21.1 57.5	16.78	24.87	433	
2	1	7	SU001 W-6	1.0	0.0 0.0	8.2 119	0.00	10.25	437	
2	1	8	SU001 W-7	1.0	6.9 131	9.7 104	16.71	10.99	426	

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54001



28 Oct 2009 12:44 ALPHA/BETA - 1.09 Page #1
Protocol #:25 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Low Energy: 3H
High Energy: 14C
Background Subtract: 1st Vial

	LL	UL	LCR	25%	BKG
Region A:	0.0 - 12.0	0	0.0	6.79	
Region B:	12.0 - 156	0	0.0	16.42	
Region C:	0.0 - 0.0	0	0.0	0.00	

Quench Indicator: tsIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA25.002

P#PID	S#	SMPL_ID	TIME	H-3		C-14		DPM1	DPM2	tsIE	FLAG
				CPMAA:25%	CPMBB:25%	CPMAA:25%	CPMBB:25%				
25 2	1		10.0	8.8	21.3	16.4	15.6			417	B
25 2	25U1	Ceiling-1	1.0	0.0	0.0	1.5	589	0.00	1.87	452	
25 2	35U1	Ceiling-2	1.0	1.2	536	3.6	261	2.17	4.23	449	
25 2	45U1	Ceiling-3	1.0	9.1	95.5	10.7	100	22.29	11.89	442	
25 2	55U1	Ceiling-4	1.0	4.2	177	2.6	352	11.11	2.54	454	
25 2	65U1	Ceiling-5	1.0	0.0	0.0	0.0	0.0	0.00	0.00	446	
25 2	75U1	Ceiling-6	1.0	2.3	301	0.0	0.0	6.64	0.00	453	
25 2	85U1	Ceiling-7	1.0	1.2	545	0.0	0.0	3.51	0.00	449	
25 2	95U1	Ceiling-8	1.0	5.2	148	12.6	88.0	10.17	14.81	447	
25 2	105U1	Ceiling-9	1.0	7.3	113	13.5	83.2	15.71	15.64	452	
25 2	115U1	Ceiling-10	1.0	5.3	147	12.5	88.3	10.30	14.72	451	
25 2	125U1	Ceiling-11	1.0	6.7	120	11.1	97.6	15.34	12.67	441	
25 7	135U1	Ceiling-12	1.0	4.0	183	12.7	87.1	6.78	15.21	441	
25 7	145U1	Ceiling-13	1.0	0.0	0.0	10.6	101	0.00	13.13	453	
25 7	155U1	Ceiling-14	1.0	2.2	312	0.0	0.0	6.43	0.00	446	
25 7	165U1	Ceiling-15	1.0	0.2	3129	10.6	101	0.00	13.12	448	
25 7	175U1	Ceiling-16	1.0	0.0	0.0	8.6	120	0.00	10.66	446	
25 7	185U1	Ceiling-17	1.0	6.2	128	9.6	110	14.30	10.92	446	
25 7	195U1	Ceiling-18	1.0	0.0	0.0	0.0	0.0	0.00	0.00	448	
25 7	205U1	Ceiling-19	1.0	0.1	4296	4.6	205	0.00	5.75	448	
25 7	215U1	Ceiling-20	1.0	0.1	****	4.7	202	0.00	5.87	441	
25 7	225U1	Ceiling-21	1.0	3.2	224	1.6	561	8.69	1.46	448	
25 7	235U1	Ceiling-22	1.0	2.3	299	0.0	0.0	6.67	0.00	453	
25 7	245U1	Ceiling-23	1.0	3.2	224	0.0	0.0	9.46	0.00	438	
25 10	255U1	Ceiling-24	1.0	0.2	2985	7.6	134	0.00	9.39	444	
25 10	265U1	Ceiling-25	1.0	3.2	224	0.0	0.0	9.29	0.00	450	
25 10	275U1	Ceiling-26	1.0	6.2	128	1.5	573	17.47	0.94	450	
25 10	285U1	Ceiling-27	1.0	17.1	60.6	13.7	82.2	44.54	14.33	442	
25 10	295U1	Ceiling-28	1.0	0.2	2985	0.6	1491	0.38	0.69	445	
25 10	305U1	Ceiling-29	1.0	11.2	81.5	12.6	88.0	28.28	13.84	431	
25 10	315U1	Ceiling-30	1.0	13.2	72.4	21.6	58.4	30.02	24.72	444	
25 10	325U1	Ceiling-31	1.0	7.3	113	6.5	153	18.58	6.90	451	
25 10	335U1	Ceiling-32	1.0	11.3	81.0	6.5	153	30.19	6.28	449	
25 10	345U1	Ceiling-33	1.0	9.2	94.5	12.6	87.9	21.71	14.21	447	
25 10	355U1	Ceiling-34	1.0	5.4	144	4.6	205	13.75	4.91	453	
25 10	365U1	Ceiling-35	1.0	11.2	81.5	7.6	134	29.73	7.64	444	
25 16	375U1	Ceiling-36	1.0	6.1	130	15.7	74.1	11.60	18.53	443	

28 Oct 2009 13:58 ALPHA/BETA - 1.09 Page #2
Protocol #:25 Smears H-3 & C-14 User : EaglePicher / ES

P#PID S#	SMPL_ID	TIME	H-3 CPMAA:2S%	C-14 CPMBB:2S%	H-3 DPM1	C-14 DPM2	tsIE	FLAG
25 16 38SU1	Ceiling-37	1.0	5.2	148	3.6	260	14.00	3.61 434
25 16 39SU1	Ceiling-38	1.0	1.2	551	0.0	0.0	3.47	0.00 448
25 16 40SU1	Ceiling-39	1.0	6.6	122	22.2	57.2	11.22	26.58 412
25 16 41SU1	Ceiling-40	1.0	5.2	148	1.6	561	14.68	1.13 440

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28 Oct 2009 14:16 ALPHA/BETA - 1.09 Page #1
Protocol #:24 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Low Energy: 3H
High Energy: 14C
Background Subtract: 1st Vial

	LL	UL	LCR	25%	BKG
Region A:	0.0 - 12.0	0	0.0	8.30	
Region B:	12.0 - 156	0	0.0	16.26	
Region C:	0.0 - 0.0	0	0.0	0.00	

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA24.002

P#PID S#	SMPL_ID	TIME	H-3		C-14		DPM1	DPM2	tSIE	FLAG
			CPHAA:25%	CPHBB:25%						
24 9 1		10.0	8.3	22.0	16.3	15.7			422	B
24 9 2	SUI-Floor#14	1.0	46.1	32.2	59.3	29.6	111.32	66.38	443	
24 9 3	SUI-Floor#15	1.0	7.7	107	12.7	86.9	17.21	14.62	452	
24 9 4	SUI-Floor#16	1.0	25.7	45.9	76.8	25.3	44.26	91.31	448	
24 9 5	SUI-Floor#17	1.0	33.2	39.2	87.2	23.5	62.24	103.17	445	
24 9 6	SUI-Floor#18	1.0	43.5	33.4	120.0	19.6	79.10	142.19	446	

*Data not used.
This area moved to
SU012.*

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28 Oct 2009 14:53 ALPHA/BETA - 1.09 Page #1
Protocol #:11 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Low Energy: 3H
High Energy: 14C
Background Subtract: 1st Vial

	LL	UL	LCR	2S%	BKG
Region A:	0.0 - 12.0	0	0.0	10.73	
Region B:	12.0 - 156	0	0.0	15.07	
Region C:	0.0 - 0.0	0	0.0	0.00	

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA11.003

P#PID S#	SMPL_ID	TIME	CPMAA:2S%	CPMBA:2S%	3H-DPM	14C-DPM	tSIE	FLAG
11 3 1		10.0	10.7 19.3	15.1 16.3	0.00	0.00	412	8
11 3 2	SUI Wall 14	1.0	755.8 7.3	529.4 8.8	2021.22	537.10	436	
11 3 3	SUI Wall 15	1.0	47.9 32.3	86.3 23.5	105.56	99.69	444	
11 3 4	SUI Wall 16	1.0	79.3 24.1	177.9 15.7	170.64	208.73	414	
11 3 5	SUI Wall 17	1.0	30.2 42.9	59.0 29.5	64.67	68.55	445	
11 3 6	SUI Wall 18	1.0	30.5 42.6	61.7 28.7	65.38	71.81	437	

Date not used.
This area moved to
SU012.

4.3.2 SU002-East Building

This was a Class 3 survey unit.

Summary results are provided in Table 4-3 which is followed by the survey package, a survey map, survey data sheets, charts presenting the survey data, instrument download reports and the smear results from the Packard Tri-Carb Liquid Scintillation counter.

Table 4-3 SU002 Summary Results

Summary Survey Unit 002 East Building, Class 3	Beta	Beta Scan Maximums* (dpm/100cm ²)	H-3 Smear (dpm/100cm ²)	C-14 Smear (dpm/100cm ²)
	Fixed Reading (dpm/100cm ²)			
Number	120	6	120	120
Average	263	5,639	3.1	5.6
Standard Deviation	1,200	N/A	5.6	6.5
Maximum	7,996	8,461	23.5	33.9

*Beta scan maximum results include maximum data from fixed readings.



FSS Survey Package Worksheet for
EaglePicher SU002

Package Identification No.: SU02F/SU02S	Prepared by: Paul C. Ely
Location: Building East Interior	Date Prepared: 9/30/2009
Area Classification: Class 3	Signature: <i>Paul Ely</i>

Area Description

The survey area includes the floor, walls and ceiling.

Historical Information

Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3.

General Survey Instructions

1. Use gas proportional detector model numbers 43-68, or equivalent detector as approved by the ES PM for beta surface activity surveys. The total instrument efficiency should use the following factors:
 - ϵ_i , 2π instrument efficiency from calibration papers. If a 4π efficiency is reported, calculate the 2π efficiency as follows using a 5% beta Back Scatter factor (BS). $\epsilon_i = (2 * \epsilon_{4\pi}) \backslash (1 + BS)$
 - ϵ_s , the beta surface efficiency is 25%.
 - ϵ_t , the total beta efficiency = $\epsilon_i * \epsilon_s$
2. Perform surface scans at a scan speed of 1 probe width per second or less for the 43-68. Any locations that exceed 2,500 cpm beta above background should be marked with a felt tip pen or equivalent and the extent of the elevated area recorded.
 - 25% scan of floor and lower walls (6-feet and below), for beta contamination and 10% scan of upper walls and ceiling for beta contamination.
3. Perform direct beta surface activity measurements at each measurement location. All ceiling surveys locations are directly above marked floor survey locations. Wall measurement locations are determined by extending the survey grids from the floors up the walls and obtaining measurements at alternating elevations of 3-feet from the floor and 7-feet from the floor. Mark and the survey location on the walls with a felt tip pen or equivalent. All surveys locations are referenced from the southwest corner of the survey unit. Random survey locations were generated for this class 3 survey unit.
4. Collect a removable surface activity sample (smear) over an area of 100 cm² in size at each measurement location provided on survey maps and place the smear in a liquid scintillation vial immediately after it was taken.

Special Instructions

- | | |
|--|---|
| <ul style="list-style-type: none"> • Source check instrumentation to C-14 for beta measurements. • The static MDC for total beta activity measurements shall be less than 3,000 dpm/100 cm². • Perform a minimum of three one-minute field backgrounds using the plastic shield on the survey surface. • Log scan measurements or record maximum scan measurement results in cpm on a Grid Scan Record. | <ul style="list-style-type: none"> • Randomly generated measurement and sampling locations are located on the attached survey map. If any location is inaccessible, offset the measurement location to the nearest usable location and mark the survey location on the map. • The attached map provides floor measurement and sampling locations (ceiling and wall locations are based on floor locations). |
|--|---|

Survey Performance (Initial and date as each item is completed)

[illegible]

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Figure 4-2 SU002 Survey Map

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EaglePicher FSS Data Sheet
Survey Unit 002
East Building

Detector Type	Detector SN	Detector (cm ²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 43-68 (beta)	119337	126	9/30/10	2350-1	95359	9/30/10
Ludlum 43-68 (beta)	091028	126	9/30/10	2350-1	117566	9/30/10
Ludlum 43-68 (beta)	095523	126	9/30/10	2350-1	80502	9/30/10
Packard Tri-Carb B2555	401863	NA	Daily	NA	NA	NA

Survey Point	Loc.*		Beta		H-3		C-14
			Fixed Reading (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)
1	F	Floor	2,005	60,000	0.0	6,000	4.0
2	F	Floor	1,804	60,000	0.0	6,000	29.7
3	F	Floor	1,952	60,000	0.0	6,000	4.6
4	F	Floor	1,103	60,000	1.8	6,000	6.6
5	F	Floor	1,358	60,000	0.0	6,000	20.2
6	F	Floor	2,812	60,000	0.0	6,000	19.6
7	F	Floor	615	60,000	0.0	6,000	2.1
8	F	Floor	1,719	60,000	0.0	6,000	1.2
9	F	Floor	1,878	60,000	0.0	6,000	8.0
10	F	Floor	1,358	60,000	3.4	6,000	4.2
11	F	Floor	2,557	60,000	0.0	6,000	33.9
12	F	Floor	743	60,000	0.0	6,000	14.1
13	F	Floor	2,005	60,000	0.0	6,000	18.1
14	F	Floor	1,687	60,000	0.0	6,000	18.8
15	F	Floor	1,390	60,000	0.0	6,000	10.2
16	F	Floor	297	60,000	0.0	6,000	11.7
17	F	Floor	355	60,000	0.0	6,000	10.1
18	F	Floor	1,946	60,000	0.0	6,000	12.7
19	F	Floor	296	60,000	0.0	6,000	3.9
20	F	Floor	1,675	60,000	0.0	6,000	13.9
21	F	Floor	381	60,000	0.0	6,000	3.9
22	F	Floor	288	60,000	0.0	6,000	6.5
23	F	Floor	1,396	60,000	0.0	6,000	12.3
24	F	Floor	1,591	60,000	0.0	6,000	4.1
25	F	Floor	1,176	60,000	0.0	6,000	10.1
26	F	Floor	652	60,000	0.0	6,000	8.5
27	F	Floor	939	60,000	0.0	6,000	9.8
28	F	Floor	482	60,000	0.0	6,000	6.1
29	F	Floor	592	60,000	9.3	6,000	20.5
30	F	Floor	702	60,000	1.0	6,000	8.6
31	F	Floor	567	60,000	11.3	6,000	15.1
32	F	Floor	728	60,000	0.0	6,000	2.6
33	F	Floor	550	60,000	0.0	6,000	11.4
34	F	Floor	1,058	60,000	0.0	6,000	7.6
35	F	Floor	93	60,000	0.0	6,000	12.4
36	F	Floor	415	60,000	0.0	6,000	8.1
37	F	Floor	423	60,000	0.0	6,000	13.6
38	F	Floor	821	60,000	0.0	6,000	6.2
39	F	Floor	533	60,000	0.0	6,000	16.3
40	F	Floor	1,185	60,000	0.0	6,000	6.0
Average	F	Floor	1,103		0.7		10.9
Standard Deviation	F	Floor	686		2.3		7.2
Maximum	F	Floor	2,812		11.3		33.9

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EaglePicher FSS Data Sheet
Survey Unit 002
East Building

Detector Type	Detector SN	Detector (cm ²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 43-68 (beta)	119337	126	9/30/10	2350-1	95359	9/30/10
Ludlum 43-68 (beta)	091028	126	9/30/10	2350-1	117566	9/30/10
Ludlum 43-68 (beta)	095523	126	9/30/10	2350-1	80502	9/30/10
Packard Tri-Carb B2555	401863	NA	Daily	NA	NA	NA

Survey Point	Loc.*		Beta		H-3		C-14
			Fixed Reading (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)
1	C	Ceiling	839	60,000	14.1	6,000	6.6
2	C	Ceiling	373	60,000	0.0	6,000	13.8
3	C	Ceiling	361	60,000	0.4	6,000	3.9
4	C	Ceiling	105	60,000	0.0	6,000	5.3
5	C	Ceiling	-291	60,000	0.0	6,000	1.5
6	C	Ceiling	268	60,000	11.5	6,000	4.5
7	C	Ceiling	-23	60,000	1.5	6,000	0.2
8	C	Ceiling	-781	60,000	19.3	6,000	11.9
9	C	Ceiling	-70	60,000	0.0	6,000	0.2
10	C	Ceiling	256	60,000	0.0	6,000	9.0
11	C	Ceiling	NA	60,000	9.3	6,000	13.0
12	C	Ceiling	NA	60,000	5.0	6,000	8.4
13	C	Ceiling	501	60,000	3.2	6,000	3.8
14	C	Ceiling	-93	60,000	7.0	6,000	3.2
15	C	Ceiling	-268	60,000	21.8	6,000	0.0
16	C	Ceiling	862	60,000	0.0	6,000	0.0
17	C	Ceiling	-210	60,000	0.0	6,000	9.0
18	C	Ceiling	478	60,000	12.3	6,000	2.1
19	C	Ceiling	117	60,000	12.9	6,000	0.8
20	C	Ceiling	163	60,000	0.0	6,000	0.1
21	C	Ceiling	-128	60,000	19.4	6,000	6.6
22	C	Ceiling	-70	60,000	2.8	6,000	14.7
23	C	Ceiling	256	60,000	0.0	6,000	7.4
24	C	Ceiling	-606	60,000	0.0	6,000	0.0
25	C	Ceiling	385	60,000	0.0	6,000	6.1
26	C	Ceiling	175	60,000	1.1	6,000	1.4
27	C	Ceiling	-268	60,000	0.0	6,000	0.3
28	C	Ceiling	256	60,000	3.7	6,000	2.5
29	C	Ceiling	210	60,000	10.6	6,000	0.0
30	C	Ceiling	35	60,000	0.0	6,000	0.3
31	C	Ceiling	47	60,000	0.0	6,000	0.0
32	C	Ceiling	396	60,000	0.0	6,000	3.9
33	C	Ceiling	175	60,000	0.0	6,000	2.9
34	C	Ceiling	-221	60,000	1.4	6,000	11.0
35	C	Ceiling	47	60,000	16.1	6,000	8.0
36	C	Ceiling	385	60,000	22.7	6,000	13.7
37	C	Ceiling	210	60,000	0.0	6,000	0.0
38	C	Ceiling	105	60,000	0.0	6,000	6.5
39	C	Ceiling	175	60,000	0.0	6,000	0.0
40	C	Ceiling	711	60,000	0.0	6,000	12.3
Average	C	Ceiling	128		4.9		4.9
Standard Deviation	C	Ceiling	344		7.2		4.7
Maximum	C	Ceiling	862		22.7		14.7

Final Status Survey Report for EaglePicher, Lenexa, Kansas

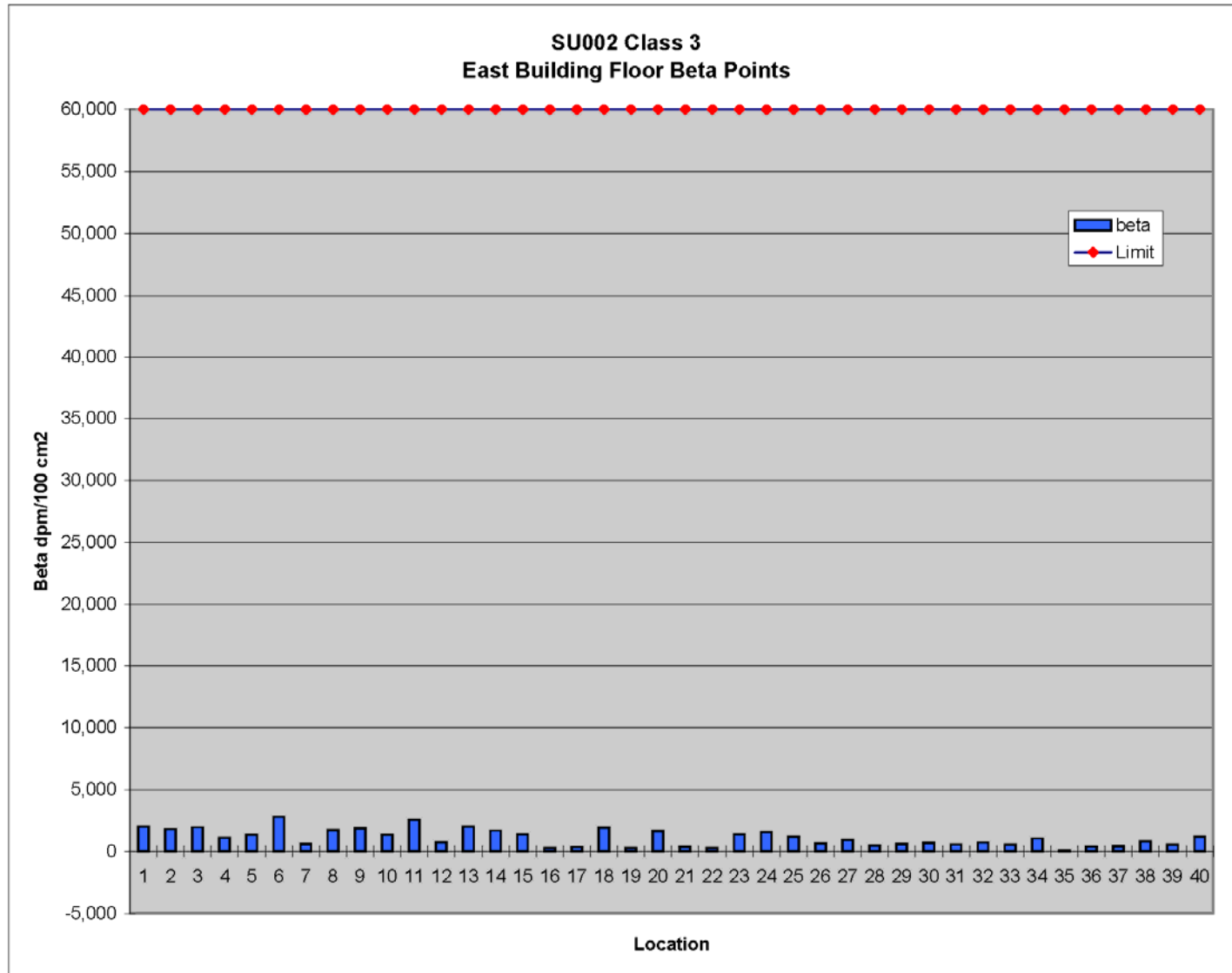
CS-HP-PN-018
Revision 1

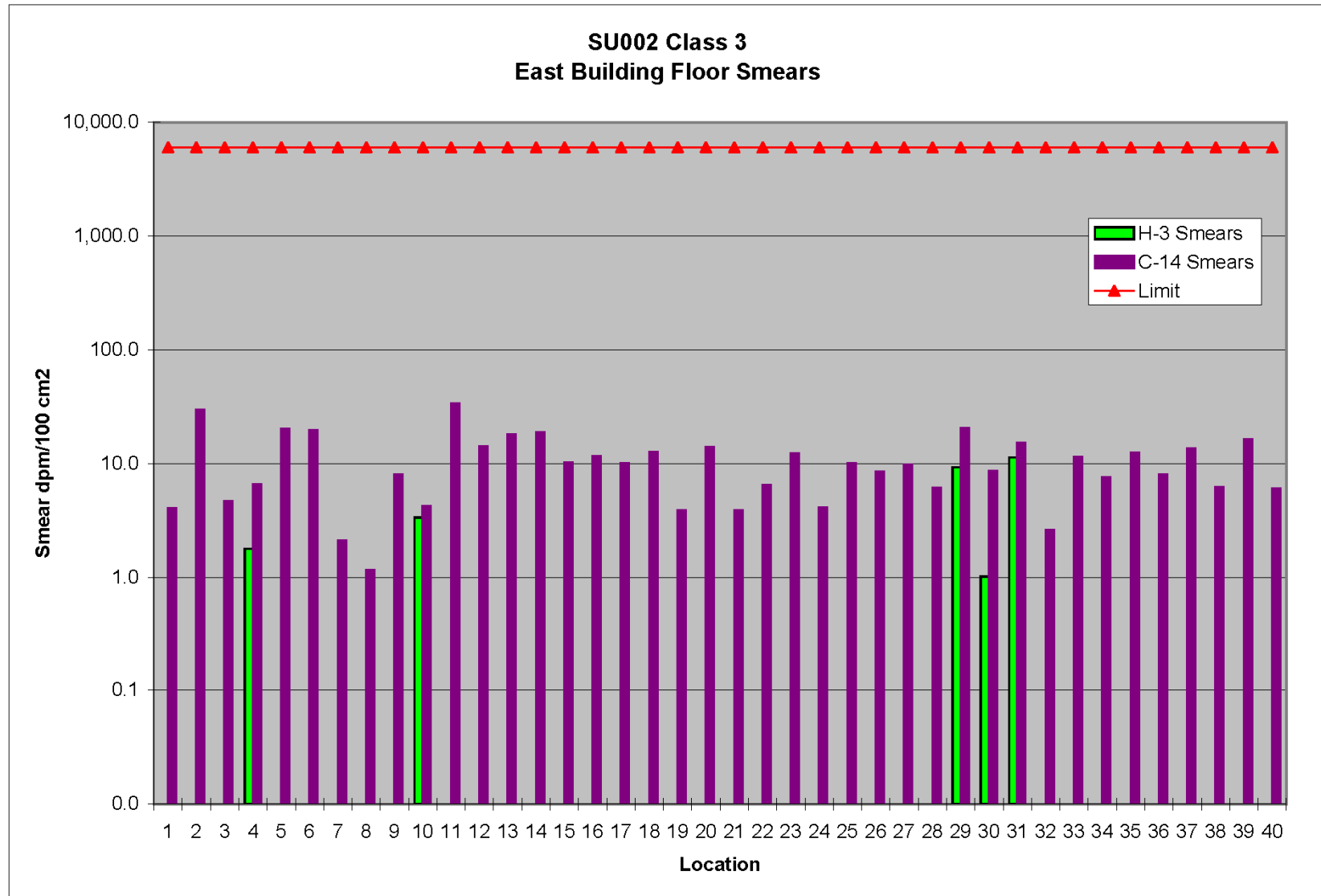
EaglePicher FSS Data Sheet
Survey Unit 002
East Building

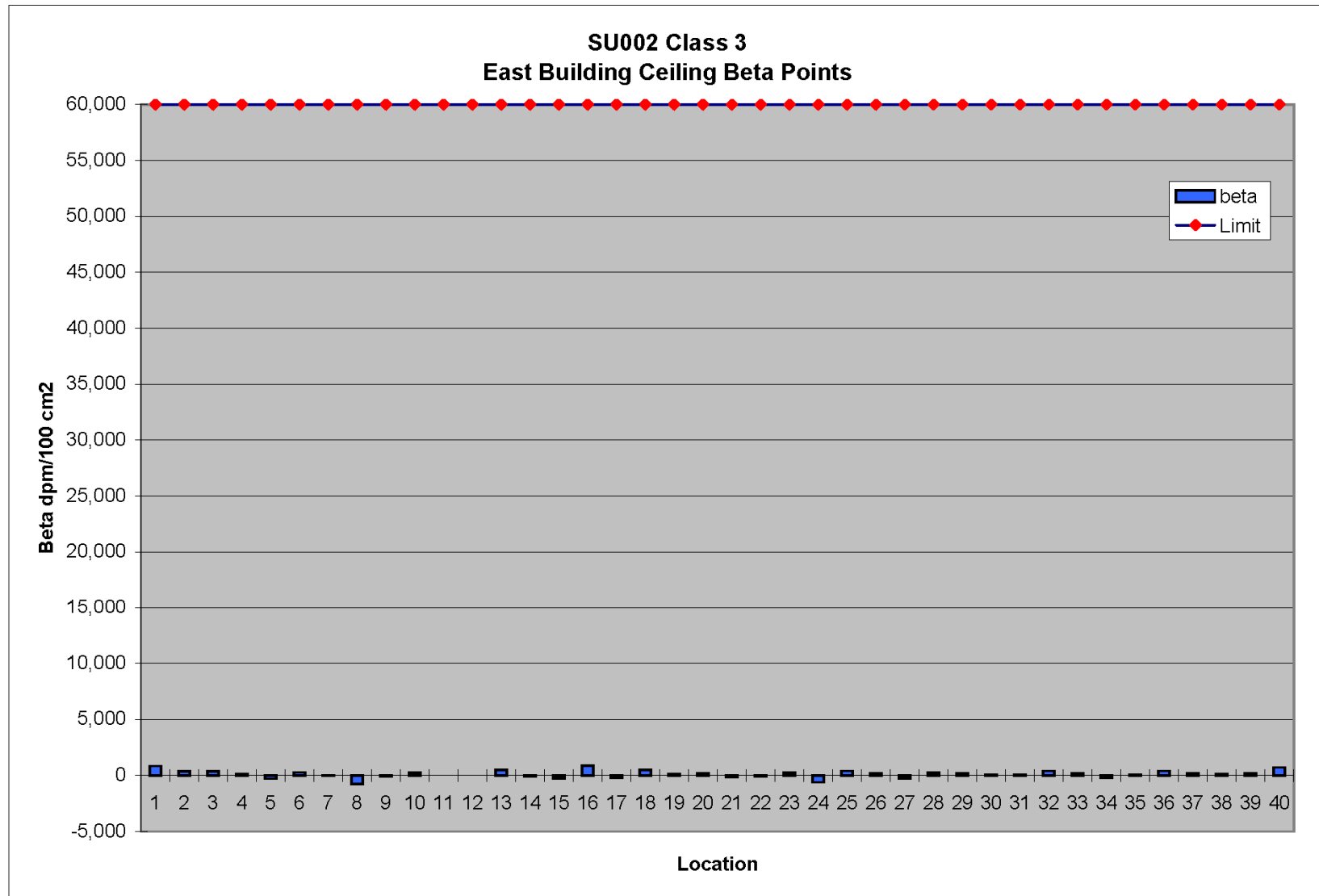
Detector Type	Detector SN	Detector (cm ²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 43-68 (beta)	119337	126	9/30/10	2350-1	95359	9/30/10
Ludlum 43-68 (beta)	091028	126	9/30/10	2350-1	117566	9/30/10
Ludlum 43-68 (beta)	095523	126	9/30/10	2350-1	80502	9/30/10
Packard Tri-Carb B2555	401863	NA	Daily	NA	NA	NA

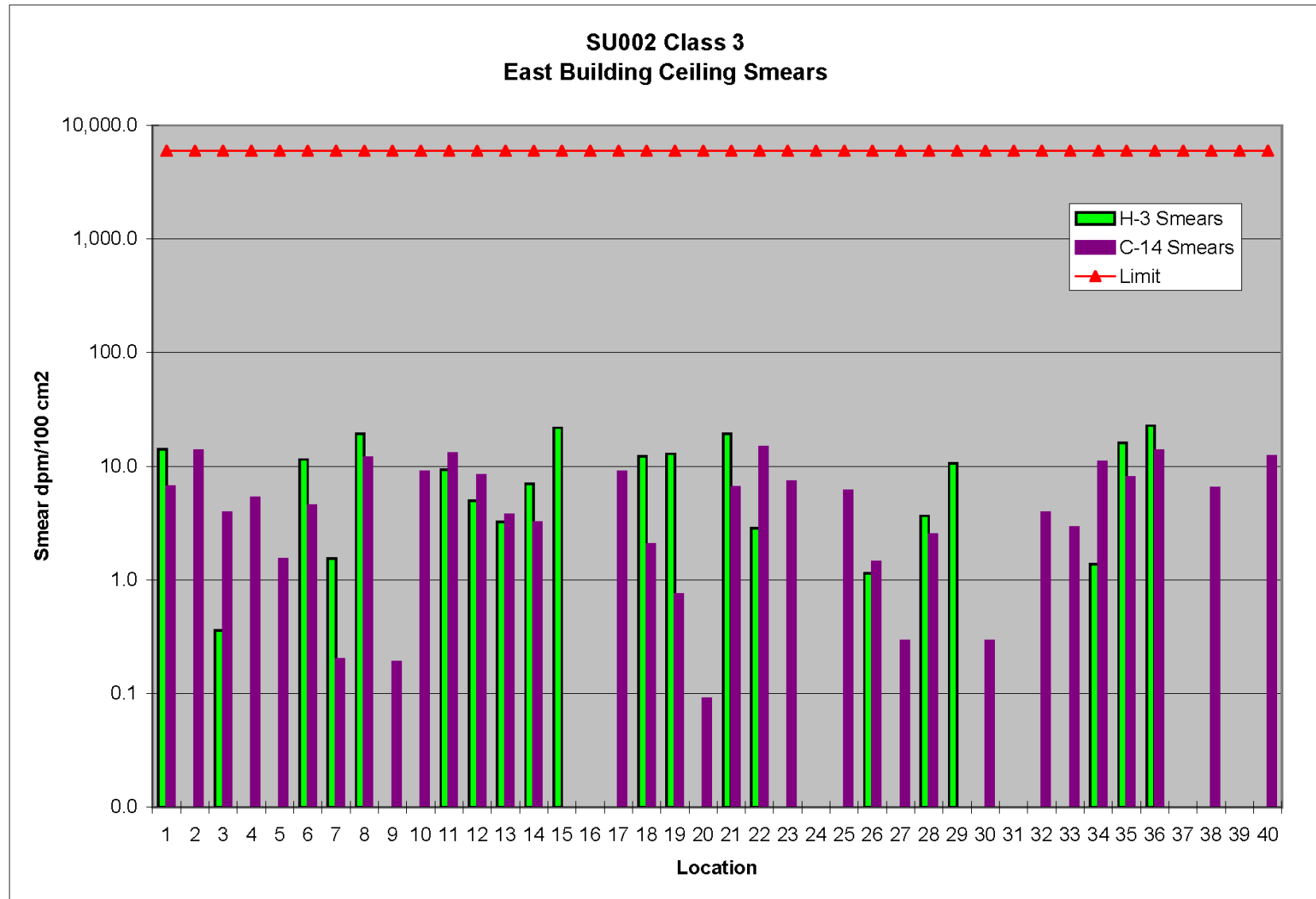
Survey Point	Loc.*		Beta		H-3		C-14
			Fixed Reading (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)
1	W	Walls	1,496	60,000	0.0	6,000	0.0
2	W	Walls	403	60,000	1.1	6,000	0.0
3	W	Walls	-944	60,000	0.0	6,000	0.0
4	W	Walls	-987	60,000	5.6	6,000	0.0
5	W	Walls	-1,093	60,000	2.9	6,000	0.0
6	W	Walls	679	60,000	0.0	6,000	0.7
7	W	Walls	-350	60,000	8.4	6,000	0.0
8	W	Walls	488	60,000	0.0	6,000	0.0
9	W	Walls	-1,061	60,000	0.0	6,000	0.0
10	W	Walls	-159	60,000	2.5	6,000	0.0
11	W	Walls	-562	60,000	4.0	6,000	0.0
12	W	Walls	626	60,000	0.0	6,000	3.8
13	W	Walls	361	60,000	10.1	6,000	7.9
14	W	Walls	552	60,000	0.0	6,000	2.2
15	W	Walls	-42	60,000	0.0	6,000	6.1
16	W	Walls	-318	60,000	5.4	6,000	0.0
17	W	Walls	-1,777	60,000	0.0	6,000	0.1
18	W	Walls	-1,582	60,000	0.0	6,000	0.0
19	W	Walls	-406	60,000	5.7	6,000	0.0
20	W	Walls	-1,616	60,000	0.0	6,000	6.3
21	W	Walls	-169	60,000	0.0	6,000	0.0
22	W	Walls	-488	60,000	0.0	6,000	0.0
23	W	Walls	7,996	60,000	10.9	6,000	4.2
24	W	Walls	-812	60,000	0.0	6,000	2.0
25	W	Walls	-499	60,000	0.0	6,000	1.2
26	W	Walls	-1,489	60,000	0.0	6,000	0.0
27	W	Walls	-1,185	60,000	6.7	6,000	4.6
28	W	Walls	-1,032	60,000	0.0	6,000	0.0
29	W	Walls	-1,303	60,000	15.9	6,000	0.0
30	W	Walls	-1,362	60,000	6.9	6,000	1.3
31	W	Walls	-795	60,000	0.0	6,000	0.0
32	W	Walls	-770	60,000	0.0	6,000	0.0
33	W	Walls	-482	60,000	23.5	6,000	12.0
34	W	Walls	-1,413	60,000	7.3	6,000	11.9
35	W	Walls	-1,853	60,000	7.3	6,000	0.0
36	W	Walls	-1,168	60,000	4.6	6,000	0.0
37	W	Walls	-1,328	60,000	0.0	6,000	0.0
38	W	Walls	-1,286	60,000	0.0	6,000	0.0
39	W	Walls	-1,379	60,000	0.0	6,000	0.0
40	W	Walls	-829	60,000	0.0	6,000	0.0
Average			-448		3.2		1.6
Standard Deviation			1,574		5.1		3.1
Maximum			7,996		23.5		12.0

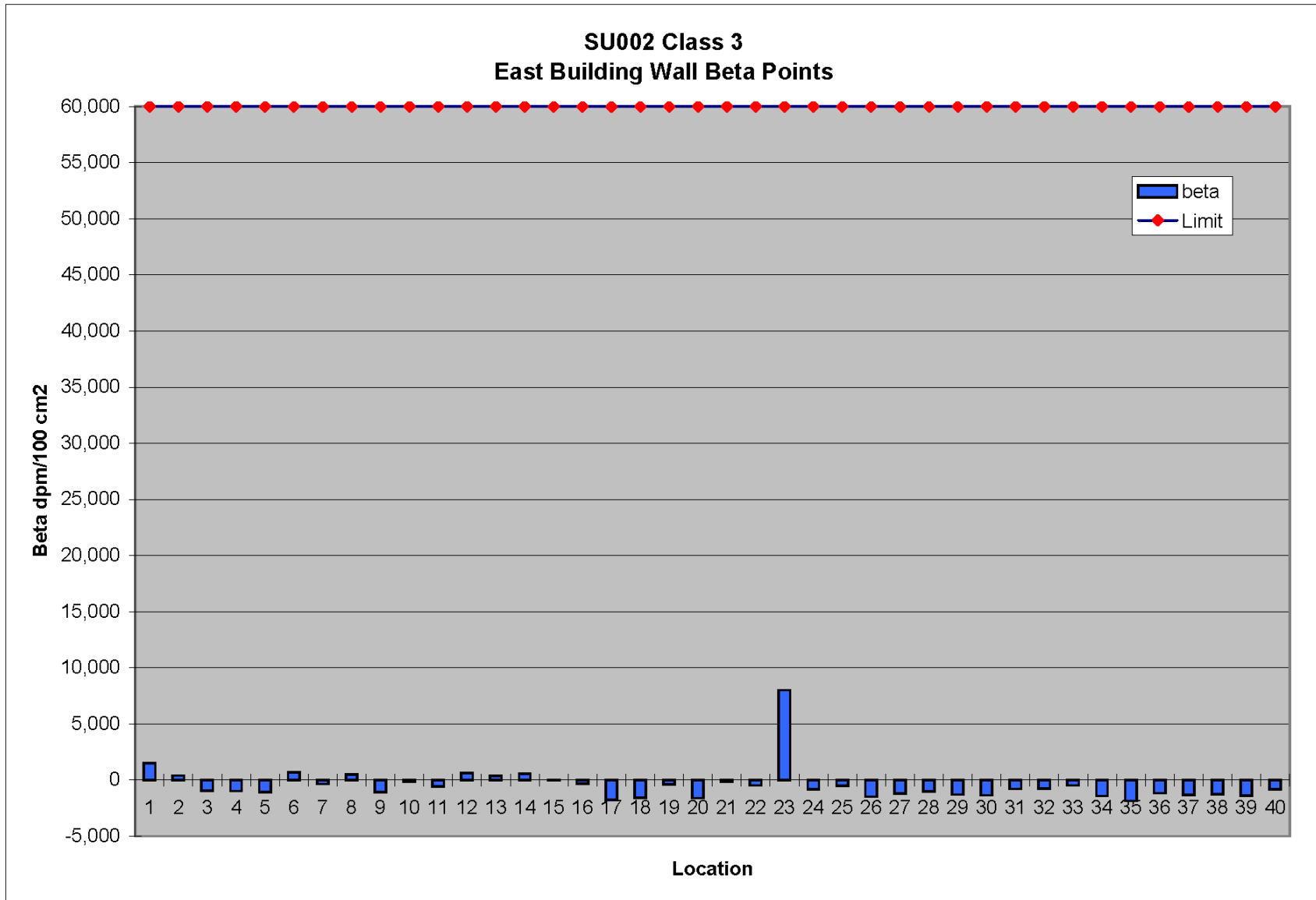
* R = Roof, F = Floor, W = Wall, C = Ceiling, E = Equipment

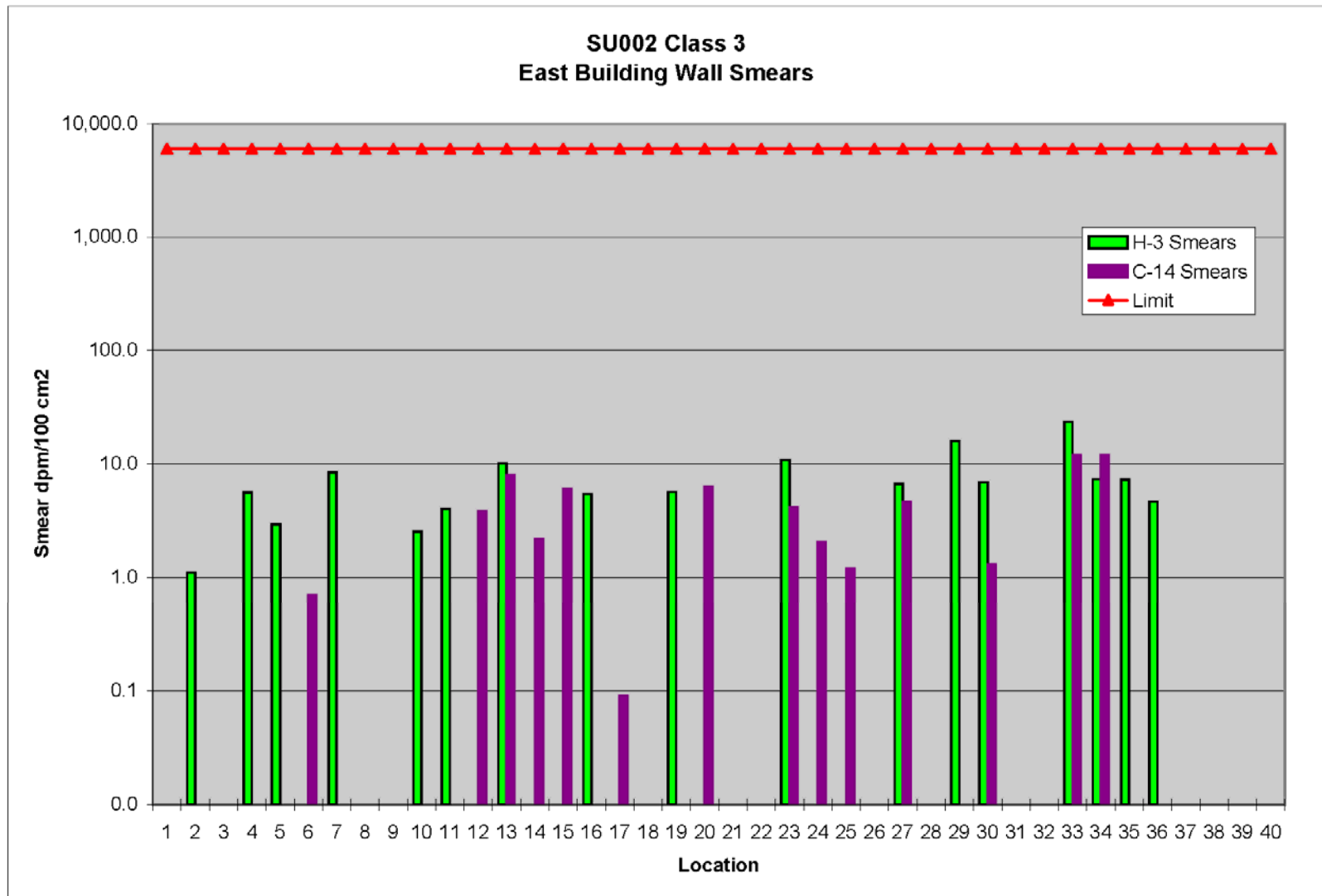














M2350-1 Download BETA Report

File Name : 00000025		Survey Description : SU02F 1,2,3,4,5,9,11 floors and walls	
Survey Reason : Final Status			
User ID : RLS2098		Technician Name : Lee Severtson	
Instrument Model : 2350-1	Instrument S/N : 117566	Instrument Cal. Due : 9/28/2010	
Detector Model : 43-68b	Detector S/N : 091028	Detector Cal. Due : 9/30/2010	
Measurement Type : BETA		Detector Type : 02200 : 126 cm ² Gas Proportional Detector	
Detector Area : 126	Efficiency : 0.0748	Survey Date : 10/22/2009	
Minimum Net DPM Observed: -1093		Mean Net DPM: 5132	
Maximum Net DPM Observed: 46643		STDEV Observed: 13720	# of Samples Taken: 21

Lee Severtson
Print Name

Lee Severtson
Signature

10-9-23-09
Date

Print Name

Signature

Date

Comments:

Sign-Off

Paul Ely
Print Name

Paul Ely
Signature

10/30/09
Date

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000025

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
ZZZZZ	ZZZZZ	0	2,849.0	600	PRBBK	B9999	ZZZZZ	1	0	3,023
ZZZZZ	ZZZZZ	1	4,396.0	60	PRSC1	B9999	ZZZZZ	1	0	46,643
SU02F	FL01	2	410.0	60	FLDRK	B002	ZZZZZ	1	392	191
SU02F	FL01	3	581.0	60	FLCT	B002	ZZZZZ	1	392	2,005
SU02F	FL01	4	496.0	60	FLCT	B002	ZZZZZ	4	392	1,103
SU02F	W01	5	299.0	60	FLCT	B004	ZZZZZ	4	392	-987
SU02F	W01	6	533.0	60	FLCT	B004	ZZZZZ	1	392	1,496
SU02F	FL01	7	409.0	60	FLDBK	B0002	ZZZZZ	2	392	180
SU02F	FL01	8	562.0	60	FLDCT	B0002	ZZZZZ	2	392	1,804
SU02F	FL01	9	576.0	60	FLDCT	B0002	ZZZZZ	3	392	1,952
SU02F	W01	10	354.0	60	FLDCT	B0004	ZZZZZ	2	392	-403
SU02F	W01	11	303.0	60	FLDCT	B0004	ZZZZZ	3	392	-944
SU02F	W01	12	339.0	60	FLDCT	B0004	ZZZZZ	11	392	-562
SU02F	FL01	13	633.0	60	FLDCT	B0002	ZZZZZ	11	392	2,557
SU02F	FL01	14	520.0	60	FLDCT	B0002	ZZZZZ	5	392	1,358
SU02F	FL01	15	569.0	60	FLDCT	B0002	ZZZZZ	9	392	1,878
SU02F	W01	16	289.0	60	FLDCT	B0004	ZZZZZ	5	392	-1,093
SU02F	W01	17	292.0	60	FLDCT	B0004	ZZZZZ	9	392	-1,061
SU02F	FL01	18	373.0	60	FLDBK	B0002	ZZZZZ	9	392	-202
ZZZZZ	ZZZZZ	19	2,920.0	600	PTBBK	B9999	ZZZZZ	11	0	3,098
ZZZZZ	ZZZZZ	20	4,311.0	60	PTSC1	B9999	ZZZZZ	2	0	45,741

Beta Flag 45000 -
Beta Max Flag 60000

Friday, October 23, 2009

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M2350-1 Download BETA Report

File Name : 00000026		Survey Description : SU02F 22,23,24,25 floors and walls	
Survey Reason : Final Status			
User ID : RPS2366		Technician Name : Richard Stoney	
Instrument Model : 2350-1	Instrument S/N : 95359	Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b	Detector S/N : 119337	Detector Cal. Due : 9/30/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm2 Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0938	Survey Date : 10/22/2009	
Minimum Net DPM Observed: -812	Mean Net DPM: 6681		
Maximum Net DPM Observed: 38092	STDEV Observed: 13310	# of Samples Taken: 14	

Richard Stoney
Print Name

Signature

Date

Print Name

Signature

Date

Comments:

Sign-Off

Print Name

Signature

Date

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000026

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
ZZZZZ	ZZZZZ	0	3,467.0	600	PRBBK	B9999		1	0	2,933
ZZZZZ	ZZZZZ	1	4,502.0	60	PRSC1	B9999	ZZZZZ	1	0	38,092
SU02F	FL01	2	413.0	60	FLDBK	B0002	ZZZZZ	22	379	288
SU02F	FL01	3	541.0	60	FLDCT	B0002	ZZZZZ	22	379	1,371
SU02F	W01	4	326.0	60	FLDCT	B0004	ZZZZZ	22	379	-448
SU02F	FL01	5	544.0	60	FLDCT	B0002	ZZZZZ	23	379	1,396
SU02F	W01	6	1,324.0	60	FLDCT	B0004	ZZZZZ	23	379	7,996
SU02F	FL01	7	567.0	60	FLDCT	B0002	ZZZZZ	24	379	1,591
SU02F	W01	8	283.0	60	FLDCT	B0004	ZZZZZ	24	379	-812
SU02F	FL01	9	518.0	60	FLDCT	B0002	ZZZZZ	25	379	1,176
SU02F	W01	10	320.0	60	FLDCT	B0004	ZZZZZ	25	379	-499
SU02F	W01	11	439.0	60	FLDBK	B0004	ZZZZZ	26	379	508
ZZZZZ	ZZZZZ	12	3,182.0	600	PTBBK	B9999	ZZZZZ	1	0	2,692
ZZZZZ	ZZZZZ	13	4,403.0	60	PTSC1	B9999	ZZZZZ	1	0	37,254

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Beta Max Flag 60000

Friday, October 23, 2009

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M2350-1 Download BETA Report

File Name : 00000027			Survey Description : SU02F points 17-21,26-40 Floor and walls		
Survey Reason : Final Status					
User ID : RPS2366		Technician Name : Richard Stoney			
Instrument Model : 2350-1		Instrument S/N : 95359		Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b		Detector S/N : 119337		Detector Cal. Due : 9/30/2010	
Measurement Type : BETA		Detector Type : 02200 : 126 cm2 Gas Proportional Detector			
Detector Area : 126		Efficiency : 0.0938		Survey Date : 10/23/2009	
Minimum Net DPM Observed: -1853		Mean Net DPM: 665			
Maximum Net DPM Observed: 35393		STDEV Observed: 5404		# of Samples Taken: 45	

Richard Stoney
Print Name

Signature

Date

10-23-2009

Print Name

Signature

Date

Comments: All Scan results < 1000 cpm

Sign-Off

Paul Ely
Print Name

Paul Ely
Signature

11/2/09
Date

Page 1 of 3

Duratek Beta Survey Report

Download File Name: 00000027

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
ZZZZZ	ZZZZZ	0	2,987.0	600	PRBBK	B9999	ZZZZZ	2	0	2,527
ZZZZZ	ZZZZZ	1	4,183.0	60	PRSC1	B9999	ZZZZZ	3	0	35,393
SU02F	FL01	2	456.0	60	FLDBK	B0002	ZZZZZ	26	464	-08
SU02F	FL01	3	541.0	60	FLDCT	B0002	ZZZZZ	26	464	652
SU02F	W01	4	288.0	60	FLDCT	B0004	ZZZZZ	26	464	-1,489
SU02F	FL01	5	575.0	60	FLDCT	B0002	ZZZZZ	27	464	939
SU02F	W01	6	324.0	60	FLOCT	B0004	ZZZZZ	27	464	-1,185
SU02F	W01	7	342.0	60	FLDCT	B0004	ZZZZZ	28	464	-1,032
SU02F	FL01	8	521.0	60	FLDCT	B0002	ZZZZZ	28	464	482
SU02F	FL01	9	534.0	60	FLDCT	B0002	ZZZZZ	29	464	592
SU02F	W01	10	310.0	60	FLDCT	B0004	ZZZZZ	29	464	-1,303
SU02F	W01	11	303.0	60	FLDCT	B0004	ZZZZZ	30	464	-1,362
SU02F	FL01	12	547.0	60	FLDCT	B0002	ZZZZZ	30	464	702
SU02F	FL01	13	531.0	60	FLDCT	B0002	ZZZZZ	31	464	567
SU02F	W01	14	370.0	60	FLDCT	B0004	ZZZZZ	31	464	-795
SU02F	W01	15	373.0	60	FLDCT	B0004	ZZZZZ	32	464	-770
SU02F	FL01	16	550.0	60	FLDCT	B0002	ZZZZZ	32	464	728
SU02F	FL01	17	529.0	60	FLDCT	B0002	ZZZZZ	33	464	560
SU02F	W01	18	407.0	60	FLDCT	B0004	ZZZZZ	33	464	-482
SU02F	W01	19	297.0	60	FLDCT	B0004	ZZZZZ	34	464	-1,413
SU02F	FL01	20	589.0	60	FLDCT	B0002	ZZZZZ	34	464	1,058
SU02F	FL01	21	475.0	60	FLDCT	B0002	ZZZZZ	35	464	93
SU02F	W01	22	245.0	60	FLDCT	B0004	ZZZZZ	35	464	-1,853
SU02F	W01	23	326.0	60	FLDCT	B0004	ZZZZZ	36	464	-1,168
SU02F	FL01	24	513.0	60	FLDCT	B0002	ZZZZZ	36	464	415
SU02F	FL01	25	514.0	60	FLDCT	B0002	ZZZZZ	37	464	423
SU02F	FL01	26	566.0	60	FLDCT	B0002	ZZZZZ	38	464	863
SU02F	W01	27	307.0	60	FLDCT	B0004	ZZZZZ	37	464	-1,328
SU02F	W01	28	312.0	60	FLDCT	B0004	ZZZZZ	38	464	-1,286
SU02F	FL01	30	527.0	60	FLDCT	B0002	ZZZZZ	39	464	533
SU02F	W01	31	301.0	60	FLDCT	B0004	ZZZZZ	39	464	-1,379
SU02F	W01	32	366.0	60	FLDCT	B0004	ZZZZZ	40	464	-829
SU02F	FL01	33	604.0	60	FLDCT	B0002	ZZZZZ	40	464	1,186
SU02F	FL01	34	506.0	60	FLDCT	B0002	ZZZZZ	17	464	355
SU02F	FL01	35	499.0	60	FLDCT	B0002	ZZZZZ	19	464	296
SU02F	FL01	36	609.0	60	FLDCT	B0002	ZZZZZ	21	464	381
SU02F	W01	37	254.0	60	FLDCT	B0004	ZZZZZ	17	464	-1,777
SU02F	W01	38	416.0	60	FLDCT	B0004	ZZZZZ	19	464	-406
SU02F	W01	39	444.0	60	FLDCT	B0004	ZZZZZ	21	464	-169

Beta Flag 45000 -
Beta Max Flag 60000

Friday, October 23, 2009

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Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU02F	FL01	40	694.0	60	FLDCT	B0002	ZZZZZ	18	464	1,946
SU02F	FL01	41	662.0	60	FLDCT	B0002	ZZZZZ	20	464	1,675
SU02F	W01	42	277.0	60	FLDCT	B0004	ZZZZZ	18	464	-1,582
SU02F	W01	43	273.0	60	FLDCT	B0004	ZZZZZ	20	464	-1,616
SU02F	W01	44	472.0	60	FLDBK	B0004	ZZZZZ	21	464	68

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Beta Max Flag 60000

Friday, October 23, 2009

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M2350-1 Download BETA Report

File Name : 00000033		Survey Description : SU002 Ceiling points 16-40	
Survey Reason : Final Status			
User ID : SXM1098		Technician Name : Sharon McChesney	
Instrument Model : 2350-1	Instrument S/N : 80502	Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b	Detector S/N : 095523	Detector Cal. Due : 9/30/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm2 Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0681	Survey Date : 10/27/2009	
Minimum Net DPM Observed : -1239	Mean Net DPM: 1382		
Maximum Net DPM Observed: 39042	STDEV Observed: 7124	# of Samples Taken: 30	

Sharon McChesney

Print Name

Sharon McChesney

Signature

10-27-09

Date

Print Name

Signature

Date

Comments:

Maximum scan 450cpm.

Sign-Off

Paul Ely

Print Name

Paul Ely

Signature

10/27/09

Date

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000033

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU02F	C01	0	2,377.0	600	PRBBK	B0012	15	2	344	-1,239
SU02F	C01	1	3,694.0	60	PRSC1	B0012	ZZZZZ	1	344	39,042
SU02F	C01	2	291.0	60	FLDBK	B0012	ZZZZZ	1	344	-618
SU02F	C01	3	418.0	60	FLDCT	B0012	ZZZZZ	16	344	862
SU02F	C01	4	326.0	60	FLDCT	B0012	ZZZZZ	17	344	-210
SU02F	C01	5	354.0	60	FLDCT	B0012	ZZZZZ	19	344	117
SU02F	C01	6	333.0	60	FLDCT	B0012	ZZZZZ	21	344	-128
SU02F	C01	7	385.0	60	FLDCT	B0012	ZZZZZ	18	344	478
SU02F	C01	8	358.0	60	FLDCT	B0012	ZZZZZ	20	344	163
SU02F	C01	9	292.0	60	FLDCT	B0012	ZZZZZ	24	344	-606
SU02F	C01	10	338.0	60	FLDCT	B0012	ZZZZZ	22	344	-70
SU02F	C01	11	366.0	60	FLDCT	B0012	ZZZZZ	23	344	256
SU02F	C01	12	366.0	60	FLDCT	B0012	ZZZZZ	28	344	256
SU02F	C01	13	362.0	60	FLDCT	B0012	ZZZZZ	29	344	210
SU02F	C01	14	347.0	60	FLDCT	B0012	ZZZZZ	30	344	35
SU02F	C01	15	359.0	60	FLDCT	B0012	ZZZZZ	26	344	175
SU02F	C01	16	321.0	60	FLDCT	B0012	ZZZZZ	27	344	-268
SU02F	C01	17	377.0	60	FLDCT	B0012	ZZZZZ	25	344	385
SU02F	C01	18	362.0	60	FLDCT	B0012	ZZZZZ	37	344	210
SU02F	C01	19	369.0	60	FLDCT	B0012	ZZZZZ	33	344	175
SU02F	C01	20	378.0	60	FLDCT	B0012	ZZZZZ	32	344	398
SU02F	C01	21	325.0	60	FLDCT	B0012	ZZZZZ	34	344	-221
SU02F	C01	22	370.0	60	FLDBK	B0012	ZZZZZ	2	344	303
SU02F	C01	23	377.0	60	FLDCT	B0012	ZZZZZ	36	344	385
SU02F	C01	24	353.0	60	FLDCT	B0012	ZZZZZ	38	344	105
SU02F	C01	25	359.0	60	FLDCT	B0012	ZZZZZ	39	344	175
SU02F	C01	26	405.0	60	FLDCT	B0012	ZZZZZ	40	344	711
SU02F	C01	27	348.0	60	FLDCT	B0012	ZZZZZ	31	344	47
SU02F	C01	28	348.0	60	FLDCT	B0012	ZZZZZ	35	344	47
SU02F	C01	29	370.0	60	FLDBK	B0012	ZZZZZ	3	344	303

Beta Flag 45000 -
Beta Max Flag 60000

Tuesday, October 27, 2009

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M2350-1 Download BETA Report

File Name : 00000032		Survey Description : SU0002 Ceiling Points 1-15	
Survey Reason : Final Status			
User ID : SXM1098		Technician Name : Sharon McChesney	
Instrument Model : 2350-1	Instrument S/N : 80502	Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b	Detector S/N : 095523	Detector Cal. Due : 9/30/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm2 Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0681	Survey Date : 10/26/2009	
Minimum Net DPM Observed : -781	Mean Net DPM : 2325		
Maximum Net DPM Observed : 41268	STDEV Observed : 9727	# of Samples Taken : 18	

Sharon McChesney
Print Name

Sharon McChesney
Signature

10-26-09
Date

Print Name

Signature

Date

Comments:

*Field Backgrounds 13 & 15 were due to
time constraints*

Sign-Off

Paul Ely
Print Name

Paul Ely
Signature

10/27/09
Date

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000032

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU02F	C01	0	312.0	60	FLDBK	B0012	1	1	351	-455
SU02F	C01	1	423.0	60	FLDCT	B0012	1	1	351	839
SU02F	C01	2	383.0	60	FLDCT	B0012	2	2	351	079
SU02F	C01	3	382.0	60	FLDCT	B0012	3	3	351	361
SU02F	C01	4	360.0	60	FLDCT	B0012	4	4	351	106
SU02F	C01	5	326.0	60	FLDCT	B0012	5	5	351	-291
SU02F	C01	6	374.0	60	FLDCT	B0012	6	6	351	268
SU02F	C01	7	349.0	60	FLDCT	B0012	7	7	351	-23
SU02F	C01	8	284.0	60	FLDCT	B0012	8	8	351	-781
SU02F	C01	9	345.0	60	FLDCT	B0012	9	9	351	-70
SU02F	C01	10	373.0	60	FLDCT	B0012	10	10	351	256
SU02F	C01	11	394.0	60	FLDCT	B0012	13	13	351	601
SU02F	C01	12	343.0	60	FLDCT	B0012	14	14	351	-93
SU02F	C01	13	359.0	60	FLDBK	B0012	15	2	351	82
SU02F	C01	14	328.0	60	FLDCT	B0012	15	15	351	-268
SU02F	C01	15	384.0	60	FLDBK	B0012	15	3	351	385
SU02F	C01	16	2,991.0	600	PTBBK	B0012	15	1	351	-605
SU02F	C01	17	3,892.0	60	PTSC1	B0012	15	1	351	41,288

Beta Flag 45000 -
Beta Max Flag 60000

Tuesday, October 27, 2009

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M2350-1 Download BETA Report

File Name : 00000028	Survey Description : SU02F 6-8,10,12-16 Floor and walls	
Survey Reason : Final Status		
User ID : RLS2098	Technician Name : Lee Severtson	
Instrument Model : 2350-1	Instrument S/N : 117566	Instrument Cal. Due : 9/26/2010
Detector Model : 43-68b	Detector S/N : 091028	Detector Cal. Due : 9/30/2010
Measurement Type : BETA	Detector Type : 02200 : 126 cm2 Gas Proportional Detector	
Detector Area : 126	Efficiency : 0.0748	Survey Date : 10/23/2009
Minimum Net DPM Observed: -859	Mean Net DPM: 2609	
Maximum Net DPM Observed: 43460	STDEV Observed: 8951	# of Samples Taken: 23

Lee Severtson
Print Name

Lee Severtson
Signature

9-23-09
Date

Print Name

Signature

Date

Comments:

Sign-Off

Paul Ely
Print Name

Paul Ely
Signature

11/2/09
Date

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000028

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
ZZZZZ	ZZZZZ	0	1,958.0	600	PRBBK	B9999	ZZZZZ	2	0	2,077
ZZZZZ	ZZZZZ	1	4,096.0	60	PRBBK	B9999	ZZZZZ	3	0	43,480
SU02F	FL01	2	321.0	60	FLDBK	B0002	ZZZZZ	7	218	1,093
SU02F	FL01	3	276.0	60	FLDCT	B0002	ZZZZZ	7	218	815
SU02F	FL01	4	288.0	60	FLDCT	B0002	ZZZZZ	12	218	743
SU02F	W01	5	185.0	60	FLDCT	B0004	ZZZZZ	7	218	350
SU02F	W01	6	277.0	60	FLDCT	B0004	ZZZZZ	12	218	626
SU02F	FL01	7	483.0	60	FLDCT	B0002	ZZZZZ	6	218	2,812
SU02F	FL01	8	380.0	60	FLDCT	B0002	ZZZZZ	8	218	1,719
SU02F	FL01	9	346.0	60	FLDCT	B0002	ZZZZZ	10	218	1,358
SU02F	FL01	10	407.0	60	FLDCT	B0002	ZZZZZ	13	218	2,005
SU02F	FL01	11	377.0	60	FLDCT	B0002	ZZZZZ	14	218	1,687
SU02F	FL01	12	349.0	60	FLDCT	B0002	ZZZZZ	15	218	1,390
SU02F	W01	13	282.0	60	FLDCT	B0004	ZZZZZ	6	218	879
SU02F	W01	14	264.0	60	FLDCT	B0004	ZZZZZ	8	218	488
SU02F	W01	15	203.0	60	FLDCT	B0004	ZZZZZ	10	218	-159
SU02F	W01	16	252.0	60	FLDCT	B0004	ZZZZZ	13	218	381
SU02F	W01	17	270.0	60	FLDCT	B0004	ZZZZZ	14	218	552
SU02F	W01	18	214.0	60	FLDCT	B0004	ZZZZZ	15	218	-42
SU02F	FL01	19	196.0	60	FLDBK	B0002	ZZZZZ	15	218	-233
SU02F	FL01	20	246.0	60	FLDCT	B0002	ZZZZZ	16	218	297
SU02F	W01	21	188.0	60	FLDCT	B0004	ZZZZZ	16	218	-318
SU02F	FL01	22	137.0	60	FLDBK	B0002	ZZZZZ	18	218	-859

Beta Flag 45000 -
Beta Max Flag 60000

Friday, October 23, 2009

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**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

25 Oct 2009 10:21 ALPHA/BETA - 1.09 Page #1
Protocol #:11 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: JH-14C Quench Sets
Low Energy: JH
Background Subtract: 1st Vial High Energy: 14C

	LL	UL	LCR	25%	BKG
Region A:	0.0 - 12.0	0	0.0	11.70	
Region B:	12.0 - 156	0	0.0	10.90	
Region C:	0.0 - 0.0	0	0.0	0.00	

Quench Indicator: tsIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA11.DAT

f-3 C-14

P#	PID	S#	SMPLE_ID	TIME	CPMA A:25%	CPMB B:25%	DPH1	DPH2	tsIE	FLAG
11	1	1		10.00	11.70 18.49	10.90 19.16			969.56	B
11	1	2	SU2 F1	1.00	0.00 0.00	3.15 244.5	0.00	4.03	354.78	
11	1	3	SU2 F2	1.00	0.00 0.00	22.90 51.58	0.00	29.70	274.16	
11	1	4	SU2 F3	1.00	0.00 0.00	3.58 220.4	0.00	4.64	277.10	
11	1	5	SU2 F4	1.00	1.11 672.2	5.25 157.2	1.78	6.56	302.41	
11	1	6	SU2 F5	1.00	0.00 0.00	15.56 67.40	0.00	20.22	273.10	
11	1	7	SU2 F6	1.00	0.00 0.00	15.10 68.94	0.00	19.63	269.05	
11	1	8	SU2 F7	1.00	0.00 0.00	1.64 450.7	0.00	2.10	302.77	
11	1	9	SU2 F8	1.00	0.00 0.00	0.91 793.4	0.00	1.15	321.65	
11	1	10	SU2 F9	1.00	0.00 0.00	6.10 139.5	0.00	7.96	259.71	
11	1	11	SU2 F10	1.00	1.02 728.2	3.38 232.2	3.36	4.20	235.96	
11	1	12	SU2 F11	1.00	0.00 0.00	26.66 46.64	0.00	33.92	331.05	
11	2	13	SU2 F12	1.00	0.00 0.00	10.63 89.49	0.00	14.07	230.18	
11	2	14	SU2 F13	1.00	0.00 0.00	13.67 74.11	0.00	19.11	229.25	
11	2	15	SU2 F14	1.00	0.00 0.00	14.10 72.45	0.00	18.79	216.93	
11	2	16	SU2 F15	1.00	0.00 0.00	8.00 111.8	0.00	10.22	315.70	
11	2	17	SU2 F16	1.00	0.98 758.2	9.42 98.25	0.00	11.67	372.39	
11	2	18	SU2 F17	1.00	0.00 0.00	8.10 110.7	0.00	10.10	413.59	
11	2	19	SU2 F18	1.00	0.00 0.00	10.10 93.07	0.00	12.65	387.26	
11	2	20	SU2 F19	1.00	0.00 0.00	3.10 250.6	0.00	3.87	413.69	
11	2	21	SU2 F20	1.00	0.00 0.00	11.10 86.58	0.00	13.87	395.61	
11	2	22	SU2 F21	1.00	0.00 0.00	3.10 250.6	0.00	3.87	409.31	
11	2	23	SU2 F22	1.00	0.00 0.00	5.10 162.1	0.00	6.46	348.43	
11	2	24	SU2 F23	1.00	0.00 0.00	9.75 95.61	0.00	12.27	372.63	
11	3	25	SU2 F24	1.00	0.00 0.00	3.27 239.1	0.00	4.08	394.93	W
11	3	26	SU2 F25	1.00	0.00 0.00	8.10 110.7	0.00	10.10	411.32	
11	3	27	SU2 F26	1.00	0.54 1345	6.86 126.6	0.00	8.46	413.77	
11	3	28	SU2 F27	1.00	0.64 1152	7.96 112.2	0.00	9.83	410.31	
11	3	29	SU2 F28	1.00	0.00 0.00	4.91 167.5	0.00	6.12	411.37	
11	3	30	SU2 F29	1.00	5.30 160.9	17.10 63.08	9.27	20.45	412.79	
11	3	31	SU2 F30	1.00	1.30 579.1	7.10 123.1	1.02	8.63	424.77	
11	3	32	SU2 F31	1.00	5.55 154.7	12.85 77.57	11.34	15.10	431.17	
11	3	33	SU2 F32	1.00	0.00 0.00	2.10 357.5	0.00	2.62	414.34	
11	3	34	SU2 F33	1.00	0.00 0.00	9.15 100.5	0.00	11.40	424.25	
11	3	35	SU2 F34	1.00	0.00 0.00	6.10 139.5	0.00	7.61	416.10	
11	3	36	SU2 F35	1.00	0.00 0.00	9.94 94.20	0.00	12.41	406.14	
11	6	37	SU2 F36	1.00	0.00 0.00	6.48 132.7	0.00	8.06	431.03	W

25 Oct 2009 11:35 ALPHA/BETA - 1.07 Page #2
Protocol #:11 Smears H-3 & C-14 User : EaglePicher / ES

P#	PID	S#	SAMPL_ID	TIME	CPMA A:25%	CPMB B:25%	H-3 DPM1	C-14 DPM2	TSIE	FLAG
11	6	38	SU2 F37	1.00	1.30 579.1	11.10 86.58	0.00	13.64	407.37	
11	6	39	SU2 F38	1.00	0.00 0.00	4.96 166.0	0.00	6.19	408.89	
11	6	40	SU2 F39	1.00	0.00 0.00	13.10 76.47	0.00	16.33	416.28	
11	6	41	SU2 F40	1.00	0.00 0.00	4.84 169.4	0.00	6.04	414.32	

**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

25 Oct 2009 11:52 ALPHA/BETA - 1.09 Page #1
Protocol #:24 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Low Energy: 3H
Background Subtract: 1st Vial High Energy: 14C

	LL	UL	LCR	26%	BKG
Region A:	0.0 - 12.0		0	0.0	10.18
Region B:	12.0 - 156		0	0.0	17.92
Region C:	0.0 - 0.0		0	0.0	0.00

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): i8
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA24.DAT

P#	PID	SM	SMPL_ID	TIME	CPMA A:26%	CPMB B:26%	H-3 DPM1	C-14 DPM2	tSIE	FLAG
24	7	1		10.00	10.18 19.83	17.92 14.94			420.71	B
24	7	2	SU2 W1	1.00	0.00 0.00	0.00 0.00	0.00	0.00	401.82	
24	7	3	SU2 W2	1.00	0.36 1897	0.00 0.00	1.10	0.00	414.79	
24	7	4	SU2 W3	1.00	0.00 0.00	0.00 0.00	0.00	0.00	458.37	
24	7	5	SU2 W4	1.00	1.02 395.5	0.00 0.00	5.64	0.00	413.57	
24	7	6	SU2 W5	1.00	0.98 714.5	0.00 0.00	2.92	0.00	428.94	
24	7	7	SU2 W6	1.00	0.00 0.00	0.56 1595	0.00	0.70	416.37	
24	7	8	SU2 W7	1.00	2.82 265.1	0.00 0.00	8.39	0.00	432.30	
24	7	9	SU2 W8	1.00	0.00 0.00	0.00 0.00	0.00	0.00	413.75	
24	7	10	SU2 W9	1.00	0.00 0.00	0.00 0.00	0.00	0.00	433.27	
24	7	11	SU2 W10	1.00	0.82 841.1	0.00 0.00	2.54	0.00	415.57	
24	7	12	SU2 W11	1.00	1.33 532.9	0.00 0.00	3.99	0.00	425.63	
24	8	13	SU2 W12	1.00	0.00 0.00	3.08 310.4	0.00	3.83	418.71	
24	8	14	SU2 W13	1.00	4.16 138.6	6.89 149.6	10.05	7.91	410.13	
24	8	15	SU2 W14	1.00	0.15 4625	1.75 528.2	0.00	2.16	417.27	
24	8	16	SU2 W15	1.00	0.00 0.00	4.85 204.2	0.00	6.05	412.72	
24	8	17	SU2 W16	1.00	1.82 395.5	0.08 11759	5.43	0.00	427.46	
24	8	18	SU2 W17	1.00	0.00 0.00	0.08 11759	0.00	0.09	420.15	
24	8	19	SU2 W18	1.00	0.00 0.00	0.00 0.00	0.00	0.00	416.45	
24	8	20	SU2 W19	1.00	1.82 395.5	0.00 0.00	5.67	0.00	411.26	
24	8	21	SU2 W20	1.00	0.00 0.00	5.08 196.2	0.00	6.33	417.72	
24	8	22	SU2 W21	1.00	0.00 0.00	0.00 0.00	0.00	0.00	414.92	
24	8	23	SU2 W22	1.00	0.00 0.00	0.00 0.00	0.00	0.00	413.01	
24	8	24	SU2 W23	1.00	4.04 193.4	3.86 251.4	10.90	4.15	412.28	
24	9	25	SU2 W24	1.00	0.00 0.00	1.64 563.5	0.00	2.04	422.50	
24	9	26	SU2 W25	1.00	0.00 0.00	0.96 952.1	0.00	1.19	419.67	
24	9	27	SU2 W26	1.00	0.00 0.00	0.00 0.00	0.00	0.00	403.47	
24	9	28	SU2 W27	1.00	2.82 265.1	4.08 239.4	6.67	4.62	439.72	
24	9	29	SU2 W28	1.00	0.00 0.00	0.00 0.00	0.00	0.00	448.74	
24	9	30	SU2 W29	1.00	5.41 150.6	0.00 0.00	15.92	0.00	438.91	
24	9	31	SU2 W30	1.00	2.52 294.0	1.38 665.3	6.91	1.31	434.35	
24	9	32	SU2 W31	1.00	0.00 0.00	0.00 0.00	0.00	0.00	434.90	
24	9	33	SU2 W32	1.00	0.00 0.00	0.00 0.00	0.00	0.00	422.46	
24	9	34	SU2 W33	1.00	9.09 99.12	10.81 102.2	23.52	11.98	414.57	
24	9	35	SU2 W34	1.00	3.82 202.7	10.08 108.3	7.33	11.92	430.61	
24	9	36	SU2 W35	1.00	2.34 314.8	0.00 0.00	7.28	0.00	410.39	
24	10	37	SU2 W36	1.00	1.57 454.8	0.00 0.00	4.64	0.00	436.76	

25 Oct 2009 13:06 ALPHA/BETA - 1.09 Page #2
Protocol #:24 Smears H-3 & C-14 User : EaglePicher / ES

P#	PID	S#	SMPL_ID	TIME	CPMA A:2S%	CPMB B:2S%	DPM1	DPM2	tsIE	FLAG
24	10	38	SU2 W37	1.00	0.00	0.00	0.00	0.00	413.94	
24	10	39	SU2 W38	1.00	0.00	0.00	0.00	0.00	426.82	
24	10	40	SU2 W39	1.00	0.00	0.00	0.00	0.00	423.5E	
24	10	41	SU2 W40	1.00	0.00	0.00	0.00	0.00	438.65	

**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

28 Oct 2009 10:41 ALPHA/BETA - 1.09 Page #1
Protocol #24 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Background Subtract: 1st Vial Low Energy: 3H
High Energy: 14C

	LL	UL	LCR	25%	8KG
Region A:	0.0 - 12.0	0	0.0	10.43	
Region B:	12.0 - 156	0	0.0	15.77	
Region C:	0.0 - 0.0	0	0.0	0.00	

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EPVPROT.DAT
Count Data Filename: C:\EPVSDATA24.001

PMPID	IS#	SMPID	TIME	CPMHA:25%	CPMBB:25%	DPM1	DPM2	tSIE	FLAG		
24	8	1	10.0	10.4	19.6	15.8	15.9	428	B		
24	8	28U	2 Ceiling-1	1.0	5.7	145	6.1	160	14.10	6.63	456
24	8	38U	2 Ceiling-2	1.0	0.0	0.0	11.1	96.2	0.00	13.76	455
24	8	48U	2 Ceiling-3	1.0	0.6	1222	3.2	281	0.36	3.92	457
24	8	58U	2 Ceiling-4	1.0	0.0	0.0	4.2	220	0.00	5.25	457
24	8	68U	2 Ceiling-5	1.0	0.0	0.0	1.2	700	0.00	1.53	454
24	8	78U	2 Ceiling-6	1.0	4.6	175	4.2	220	11.46	4.34	456
24	8	88U	2 Ceiling-7	1.0	0.6	1222	0.2	3615	1.54	0.20	455
24	8	98U	2 Ceiling-8	1.0	8.2	108	10.6	99.7	19.32	11.88	456
24	8	108U	2 Ceiling-9	1.0	0.0	0.0	0.2	5574	0.00	0.19	452
24	8	118U	2 Ceiling-10	1.0	0.0	0.0	7.2	137	0.00	8.98	445
24	8	128U	2 Ceiling-11	1.0	4.8	167	11.0	96.3	9.31	12.96	457
24	9	138U	2 Ceiling-12	1.0	2.7	279	7.1	139	4.87	8.40	454
24	9	148U	2 Ceiling-13	1.0	1.6	461	3.2	281	3.24	3.77	454
24	9	158U	2 Ceiling-14	1.0	2.9	265	2.9	306	7.04	3.21	455
24	9	168U	2 Ceiling-15	1.0	7.6	115	0.0	0.0	21.81	0.00	453
24	9	178U	2 Ceiling-16	1.0	0.0	0.0	0.0	0.0	0.00	0.00	450
24	9	188U	2 Ceiling-17	1.0	0.0	0.0	7.2	137	0.00	8.98	456
24	9	198U	2 Ceiling-18	1.0	4.6	175	2.2	396	12.27	2.06	454
24	9	208U	2 Ceiling-19	1.0	4.6	174	1.2	726	12.88	0.75	450
24	9	218U	2 Ceiling-20	1.0	0.0	0.0	0.1	1111	0.00	0.09	456
24	9	228U	2 Ceiling-21	1.0	7.6	115	6.2	156	19.41	6.55	451
24	9	238U	2 Ceiling-22	1.0	2.6	285	12.2	89.3	2.84	14.69	452
24	9	248U	2 Ceiling-23	1.0	0.0	920	0.0	160	0.00	7.39	457
24	10	258U	2 Ceiling-24	1.0	0.0	0.0	0.0	0.0	0.00	0.00	452
24	10	268U	2 Ceiling-25	1.0	0.0	0.0	4.9	192	0.00	6.09	456
24	10	278U	2 Ceiling-26	1.0	0.6	1222	1.2	700	1.14	1.44	456
24	10	288U	2 Ceiling-27	1.0	0.0	0.0	0.2	3615	0.00	0.29	455
24	10	298U	2 Ceiling-28	1.0	1.6	461	2.2	396	3.67	2.53	448
24	10	308U	2 Ceiling-29	1.0	3.7	212	0.0	0.0	10.58	0.00	453
24	10	318U	2 Ceiling-30	1.0	0.0	0.0	0.2	3615	0.00	0.29	451
24	10	328U	2 Ceiling-31	1.0	0.0	0.0	0.0	0.0	0.00	0.00	450
24	10	338U	2 Ceiling-32	1.0	0.0	0.0	3.1	289	0.00	3.89	451
24	10	348U	2 Ceiling-33	1.0	0.0	0.0	2.3	379	0.00	2.91	452
24	10	358U	2 Ceiling-34	1.0	1.7	424	9.1	113	1.37	11.01	455
24	10	368U	2 Ceiling-35	1.0	6.6	129	7.2	137	15.11	7.95	452
24	1	378U	2 Ceiling-36	1.0	9.6	95.9	12.2	88.9	22.74	13.69	454

Sample ID Time CPM A CPM B DPM1 DPM2 tSIE
22 22 H-3 C-14

Final Status Survey Report
for EaglePicher, Lenexa, Kansas

CS-HP-PN-018
Revision 1

28 Oct 2009 11:55 ALPHA/BETA - 1.09 Page #2
Protocol #:24 Smears H-3 & C-14 User : EaglePicher / ES

P#PID	S#	SMPL_ID	TIME	CPMAA:2S%	CPMEE:2S%	DPM1	DPM2	tsIE	FLAG
24	1	385U	2 Ceiling-37	1.0	0.0 0.0	0.0 0.0	0.00	0.00	454

24	1	395U	2 Ceiling-38	1.0	0.0 0.0	5.2 182	0.00	6.49	455
24	1	405U	2 Ceiling-39	1.0	0.0 0.0	0.0 0.0	0.00	0.00	455
24	1	415U	2 Ceiling-40	1.0	0.0 0.0	9.9 106	0.00	12.25	454

H3 C-14
DPM1 DPM2 tsIE

4.3.3 SU003-Exterior Walls

This was a Class 3 survey unit.

Summary results are provided in Table 4-4 which is followed by the survey package, a survey map, survey data sheets, charts presenting the survey data, instrument download reports and the smear results from the Packard Tri-Carb Liquid Scintillation counter.

Table 4-4: SU003 Summary Results

Summary Survey Unit 003 Exterior Walls, Class 3	Beta	Beta Scan Maximums* (dpm/100cm ²)	H-3 Smear (dpm/100cm ²)	C-14 Smear (dpm/100cm ²)
	Fixed Reading (dpm/100cm ²)			
Number	40	2	40	40
Average	2,343	4,838	7	2
Standard Deviation	665	N/A	7	4
Maximum	3,310	6,366	28	17

*Beta scan maximum results include maximum data from fixed readings.



FSS Survey Package Worksheet for
EaglePicher SU003

Package Identification No.: SU03F/SU03S	Prepared by: Paul C. Ely
Location: Building Exterior Walls	Date Prepared: 9/30/2009
Area Classification: Class 3	Signature: <i>Paul Ely</i>

Area Description

The survey area includes the Exterior building walls.

Historical Information

Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3.

General Survey Instructions

1. Use gas proportional detector model numbers 43-68, or equivalent detector as approved by the ES PM for beta surface activity surveys. The total instrument efficiency should use the following factors:
 - ϵ_i , 2π instrument efficiency from calibration papers. If a 4π efficiency is reported, calculate the 2π efficiency as follows using a 5% beta Back Scatter factor (BS). $\epsilon_i = (2 * \epsilon_{4\pi}) \backslash (1 + BS)$
 - ϵ_s , the beta surface efficiency is 25%.
 - ϵ_t , the total beta efficiency = $\epsilon_i * \epsilon_s$
2. Perform surface scans at a scan speed of 1 probe width per second or less for the 43-68. Any locations that exceed 2,500 cpm beta above background should be marked with a felt tip pen or equivalent and the extent of the elevated area recorded.
 - 25% scan of lower walls (6-feet and below) for beta contamination and 10% scan of upper walls for beta contamination.
3. Perform direct beta surface activity measurements at each measurement location. Mark and the survey location on the walls with a felt tip pen or equivalent. All surveys locations are referenced from the southwest corner of the survey unit. Random survey locations were generated for this class 3 survey unit.
4. Collect a removable surface activity sample (smear) over an area of 100 cm² in size at each measurement location provided on survey maps and place the smear in a liquid scintillation vial immediately after it was taken.

Special Instructions

- | | |
|--|---|
| <ul style="list-style-type: none"> • Source check instrumentation to C-14 for beta measurements. • The static MDC for total beta activity measurements shall be less than 3,000 dpm/100 cm². • Perform a minimum of three one-minute field backgrounds using the plastic shield on the survey surface. • Log scan measurements or record maximum scan measurement results in cpm on a Grid Scan Record. | <ul style="list-style-type: none"> • Randomly generated measurement and sampling locations are indicated on the attached survey map. If any location is inaccessible, offset the measurement location to the nearest usable location and mark the survey location on the map. • The attached map provides measurement and sampling locations. |
|--|---|

Survey Performance (Initial and date as each item is completed)

[illegible]

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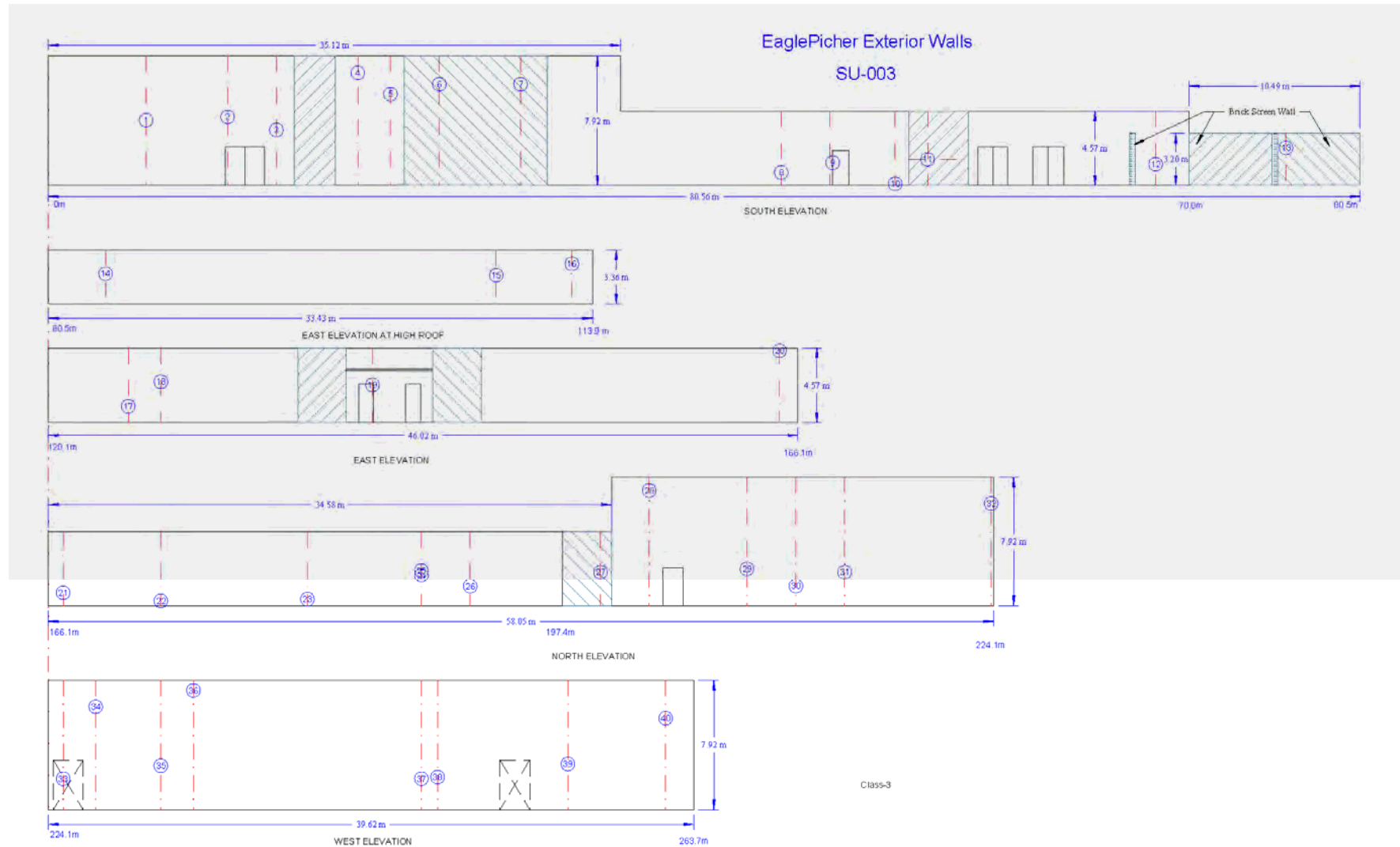


Figure 4-3 SU003 Survey Map

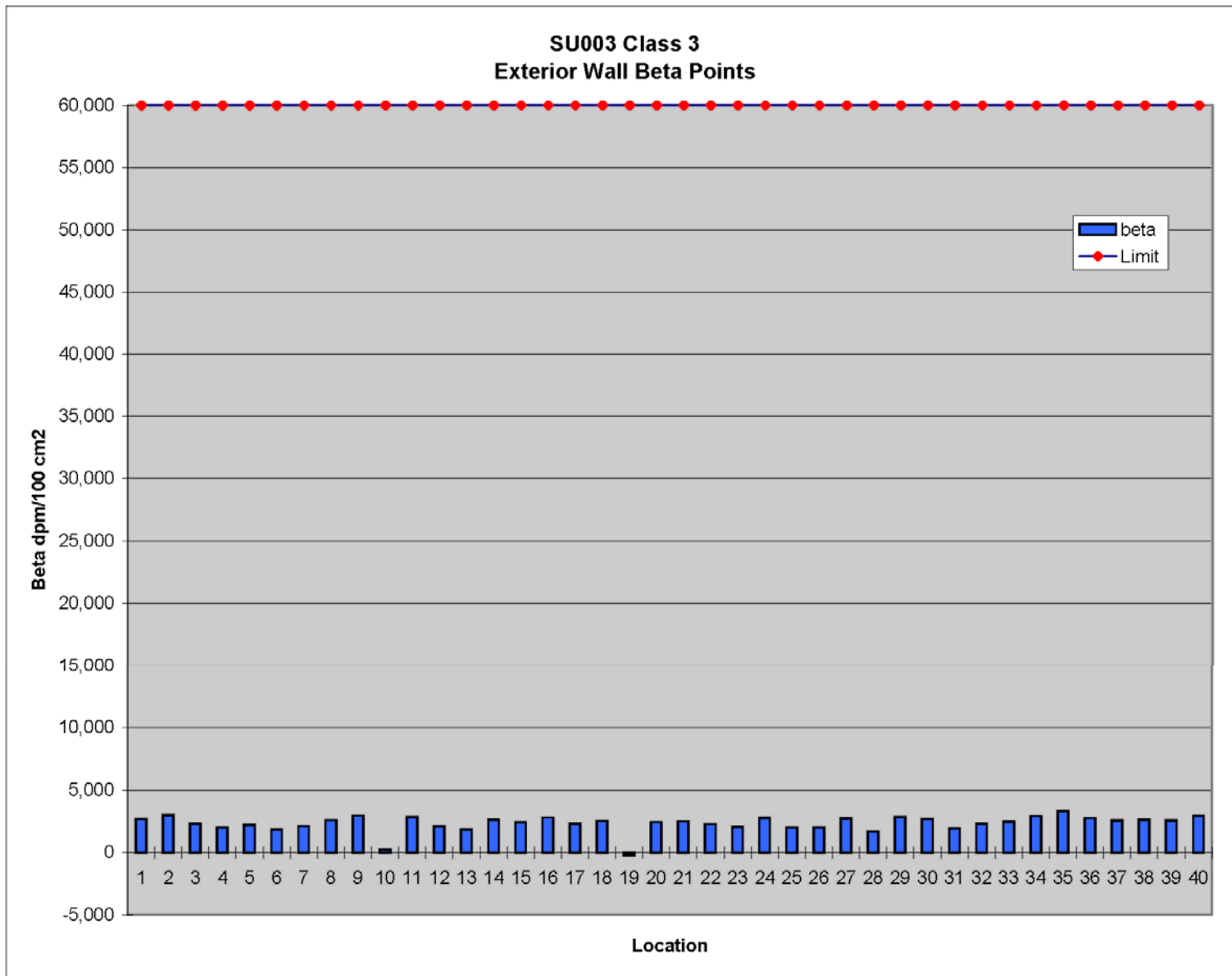
Final Status Survey Report for EaglePicher, Lenexa, Kansas

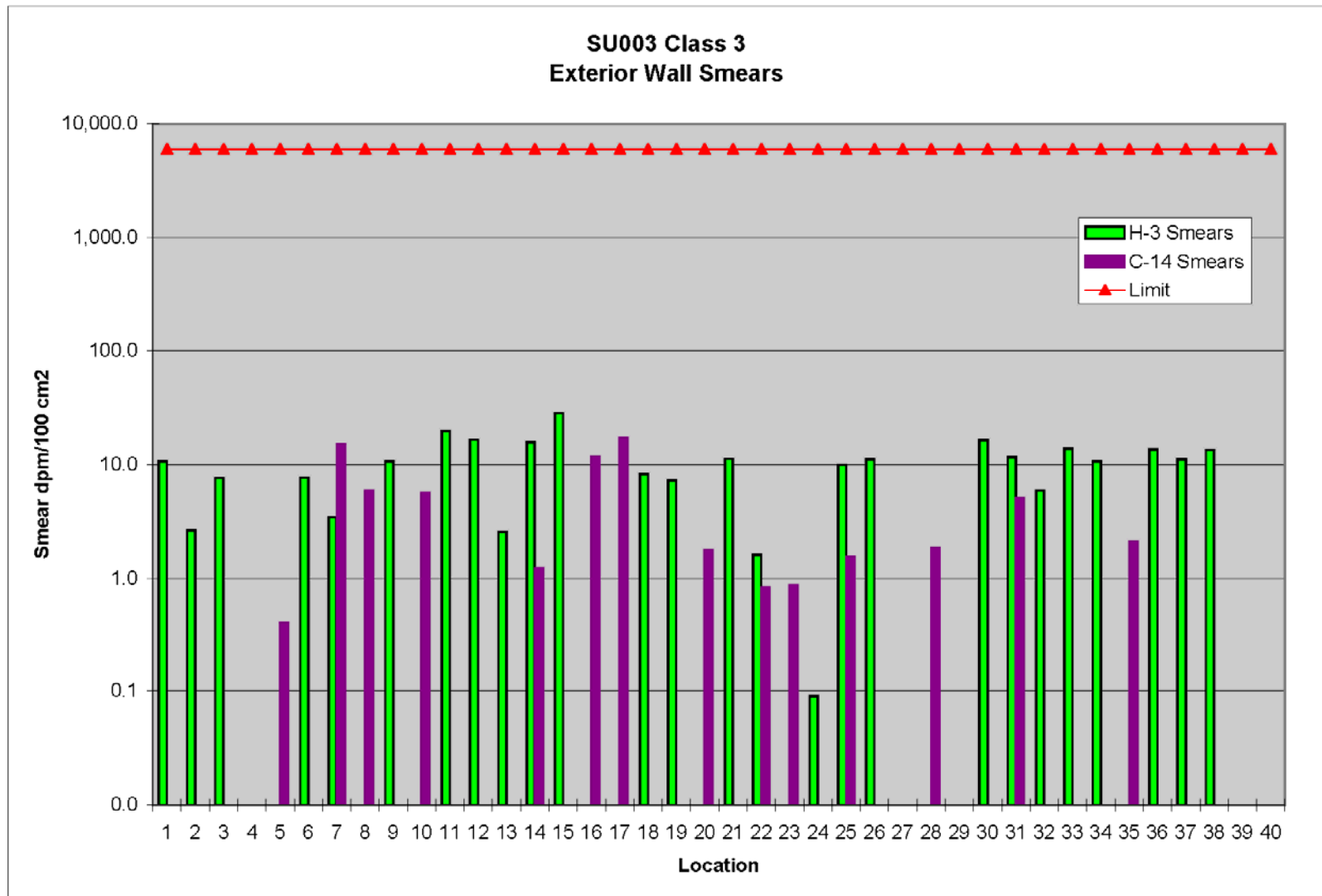
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EaglePicher FSS Data Sheet
Survey Unit 003
Exterior Walls

Detector Type	Detector SN	Detector	Detector Cal	Meter Type	Meter SN	Meter Cal Due
Ludlum 43-68 (beta)	091028	(cm ²)	Due	2350-1	117566	9/30/10
Packard Tri-Carb B2555	401663	NA	Daily	NA	NA	NA

Survey Point	Loc.*		Beta		H-3		C-14
			Fixed Reading (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)
1	W	Walls	2,695	60,000	10.6	6,000	0.0
2	W	Walls	3,003	60,000	2.6	6,000	0.0
3	W	Walls	2,324	60,000	7.6	6,000	0.0
4	W	Walls	1,984	60,000	0.0	6,000	0.0
5	W	Walls	2,207	60,000	0.0	6,000	0.4
6	W	Walls	1,846	60,000	7.7	6,000	0.0
7	W	Walls	2,122	60,000	3.4	6,000	15.1
8	W	Walls	2,600	60,000	0.0	6,000	5.9
9	W	Walls	2,971	60,000	10.6	6,000	0.0
10	W	Walls	233	60,000	0.0	6,000	5.6
11	W	Walls	2,833	60,000	19.7	6,000	0.0
12	W	Walls	2,090	60,000	16.4	6,000	0.0
13	W	Walls	1,825	60,000	2.6	6,000	0.0
14	W	Walls	2,642	60,000	15.6	6,000	1.2
15	W	Walls	2,409	60,000	28.1	6,000	0.0
16	W	Walls	2,812	60,000	0.0	6,000	11.7
17	W	Walls	2,302	60,000	0.0	6,000	16.9
18	W	Walls	2,557	60,000	8.2	6,000	0.0
19	W	Walls	-244	60,000	7.2	6,000	0.0
20	W	Walls	2,451	60,000	0.0	6,000	1.8
21	W	Walls	2,504	60,000	11.2	6,000	0.0
22	W	Walls	2,281	60,000	1.6	6,000	0.8
23	W	Walls	2,048	60,000	0.0	6,000	0.9
24	W	Walls	2,801	60,000	0.1	6,000	0.0
25	W	Walls	1,984	60,000	10.0	6,000	1.5
26	W	Walls	2,005	60,000	11.1	6,000	0.0
27	W	Walls	2,727	60,000	0.0	6,000	0.0
28	W	Walls	1,708	60,000	0.0	6,000	1.8
29	W	Walls	2,844	60,000	0.0	6,000	0.0
30	W	Walls	2,695	60,000	16.4	6,000	0.0
31	W	Walls	1,931	60,000	11.6	6,000	5.1
32	W	Walls	2,313	60,000	5.9	6,000	0.0
33	W	Walls	2,462	60,000	13.7	6,000	0.0
34	W	Walls	2,918	60,000	10.7	6,000	0.0
35	W	Walls	3,310	60,000	0.0	6,000	2.1
36	W	Walls	2,769	60,000	13.5	6,000	0.0
37	W	Walls	2,578	60,000	11.1	6,000	0.0
38	W	Walls	2,642	60,000	13.4	6,000	0.0
39	W	Walls	2,589	60,000	0.0	6,000	0.0
40	W	Walls	2,960	60,000	0.0	6,000	0.0
Average	W	Walls	2,343		6.8		1.8
Standard Deviation	W	Walls	665		7.0		4.0
Maximum	W	Walls	3,310		28.1		16.9







M2350-1 Download BETA Report

File Name : 00000034			Survey Description : SU03F Outside Building Walls points 1-40		
Survey Reason : Final Status					
User ID : RLS2098		Technician Name : Lee Severtson			
Instrument Model : 2350-1		Instrument S/N : 117566		Instrument Cal. Due : 9/26/2010	
Detector Model : 43-68b		Detector S/N : 091028		Detector Cal. Due : 9/28/2010	
Measurement Type : BETA		Detector Type : 02200 : 126 cm2 Gas Proportional Detector			
Detector Area : 126		Efficiency : 0.0748		Survey Date : 10/26/2009	
Minimum Net DPM Observed : 244		Mean Net DPM : 3963			
Maximum Net DPM Observed : 43088		STDEV Observed : 8265		# of Samples Taken : 47	

Lee Severtson		10-26-09
Print Name	Signature	Date
Sean McChesney		10/26/09
Print Name	Signature	Date

Comments:

No scan readings found > 600 cpm

Sign-Off

Print Name

Signature

10/27/09
Date

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Duratek Beta Survey Report

Download File Name: 00000034

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
ZZZZZ	ZZZZZ	0	1,773.0	600	PRBBK	ZZZZZ	ZZZZZ	5	0	1,881
ZZZZZ	ZZZZZ	1	3,970.0	60	PRBBK	ZZZZZ	ZZZZZ	6	0	42,123
ZZZZZ	ZZZZZ	2	2,093.0	600	PRBBK	ZZZZZ	ZZZZZ	7	0	2,221
ZZZZZ	ZZZZZ	3	4,081.0	60	PRSC1	ZZZZZ	ZZZZZ	1	0	43,088
SU03F	W01	4	326.0	60	FLDBK	B0021	ZZZZZ	1	259	711
SU03F	W01	5	513.0	60	FLDCT	B0021	ZZZZZ	1	259	2,695
SU03F	W01	6	542.0	60	FLDCT	B0021	ZZZZZ	2	259	3,003
SU03F	W01	7	478.0	60	FLDCT	B0021	ZZZZZ	3	259	2,324
SU03F	W01	8	446.0	60	FLDCT	B0021	ZZZZZ	4	259	1,984
SU03F	W01	9	467.0	60	FLDCT	B0021	ZZZZZ	5	259	2,207
SU03F	W01	10	433.0	60	FLDCT	B0021	ZZZZZ	6	259	1,846
SU03F	W01	11	459.0	60	FLDCT	B0021	ZZZZZ	7	259	2,122
SU03F	W01	12	504.0	60	FLDCT	B0021	ZZZZZ	8	259	2,600
SU03F	W01	13	539.0	60	FLDCT	B0021	ZZZZZ	9	259	2,971
SU03F	W01	14	281.0	60	FLDCT	B0021	ZZZZZ	10	259	233
SU03F	W01	15	526.0	60	FLDCT	B0021	ZZZZZ	11	259	2,833
SU03F	W01	16	456.0	60	FLDCT	B0021	ZZZZZ	12	259	2,090
SU03F	W01	17	431.0	60	FLDCT	B0021	ZZZZZ	13	259	1,825
SU03F	W01	18	478.0	60	FLDCT	B0021	ZZZZZ	17	259	2,302
SU03F	W01	19	500.0	60	FLDCT	B0021	ZZZZZ	16	259	2,557
SU03F	W01	20	235.0	60	FLDCT	B0021	ZZZZZ	19	259	-244
SU03F	W01	21	490.0	60	FLDCT	B0021	ZZZZZ	20	259	2,451
SU03F	W01	22	495.0	60	FLDCT	B0021	ZZZZZ	21	259	2,504
SU03F	W01	23	474.0	60	FLDCT	B0021	ZZZZZ	22	259	2,281
SU03F	W01	24	367.0	60	FLDBK	B0021	ZZZZZ	22	259	1,148
SU03F	W01	25	452.0	60	FLDCT	B0021	ZZZZZ	23	259	2,048
SU03F	W01	26	523.0	60	FLDCT	B0021	ZZZZZ	24	259	2,801
SU03F	W01	27	445.0	60	FLDCT	B0021	ZZZZZ	25	259	1,984
SU03F	W01	28	448.0	60	FLDCT	B0021	ZZZZZ	26	259	2,005
SU03F	W01	29	516.0	60	FLDCT	B0021	ZZZZZ	27	259	2,727
SU03F	W01	30	420.0	60	FLDCT	B0021	ZZZZZ	28	259	1,708
SU03F	W01	31	527.0	60	FLDCT	B0021	ZZZZZ	29	259	2,844
SU03F	W01	32	513.0	60	FLDCT	B0021	ZZZZZ	30	259	2,695
SU03F	W01	33	441.0	60	FLDCT	B0021	ZZZZZ	31	259	1,931
SU03F	W01	34	477.0	60	FLDCT	B0021	ZZZZZ	32	259	2,313
SU03F	W01	35	461.0	60	FLDCT	B0021	ZZZZZ	33	259	2,462
SU03F	W01	36	534.0	60	FLDCT	B0021	ZZZZZ	34	259	2,918
SU03F	W01	37	571.0	60	FLDCT	B0021	ZZZZZ	35	259	3,310
SU03F	W01	38	520.0	60	FLDCT	B0021	ZZZZZ	36	259	2,769

Beta Flag 45000 -
Beta Max Flag 60000

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Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU03F	W01	39	502.0	60	FLDCT	B0021	ZZZZZ	37	259	2,578
SU03F	W01	40	508.0	60	FLDCT	B0021	ZZZZZ	38	259	2,642
SU03F	W01	41	503.0	60	FLDCT	B0021	ZZZZZ	39	259	2,589
SU03F	W01	42	538.0	60	FLDCT	B0021	ZZZZZ	40	259	2,960
SU03F	W01	43	508.0	60	FLDCT	B0021	ZZZZZ	14	259	2,642
SU03F	W01	44	486.0	60	FLDCT	B0021	ZZZZZ	15	259	2,409
SU03F	W01	45	524.0	60	FLDCT	B0021	ZZZZZ	16	259	2,812
SU03F	W01	46	385.0	60	FLDBK	B0021	ZZZZZ	16	259	1,337

Beta Flag 45000 -
Beta Max Flag 60000

Tuesday, October 27, 2009

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**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

27 Oct 2009 16:09 ALPHA/BETA - 1.09 54003 Page #1
Protocol #:11 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Low Energy: 3H
Background Subtract: 1st Vial High Energy: 14C

	LL	UL	LCR	25%	BKG
Region A:	0.0 - 12.0	0	0.0	9.30	
Region B:	12.0 - 156	0	0.0	18.30	
Region C:	0.0 - 0.0	0	0.0	0.00	

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA11.001

P#PID	S#	SMPL_ID	TIME	CPMAA:25%	CPMBB:25%	DPM1	DPM2	tSIE	FLAG
11	1	1	10.0	9.3	20.7	18.3	14.8	422	B
11	1	2EX Wall #1	1.0	3.7	202	0.0	0.0	10.63	455
11	1	3EX Wall #2	1.0	0.9	724	0.0	0.0	2.64	459
11	1	4EX Wall #3	1.0	2.7	266	0.0	0.0	7.62	467
11	1	5EX Wall #4	1.0	0.0	0.0	0.0	0.0	0.00	461
11	1	6EX Wall #5	1.0	0.0	0.0	0.3	2833	0.00	454
11	1	7EX Wall #6	1.0	2.7	266	0.0	0.0	7.72	458
11	1	8EX Wall #7	1.0	2.9	250	12.5	91.4	3.43	453
11	1	9EX Wall #8	1.0	0.0	0.0	4.7	212	0.00	432
11	1	10EX Wall #9	1.0	3.7	202	0.0	0.0	10.63	455
11	1	11EX Wall #10	1.0	0.0	0.0	4.5	220	0.00	411
11	1	12EX Wall #11	1.0	6.7	123	0.0	0.0	19.66	440
11	2	13EX Wall #12	1.0	5.7	140	0.0	0.0	16.36	456
11	2	14EX Wall #13	1.0	0.9	744	0.0	0.0	2.57	457
11	2	15EX Wall #14	1.0	5.7	140	1.7	549	13.63	459
11	2	16EX Wall #15	1.0	9.7	92.1	0.0	0.0	28.12	449
11	2	17EX Wall #16	1.0	0.8	793	9.6	114	0.00	455
11	2	18EX Wall #17	1.0	0.0	0.0	13.6	85.3	0.00	452
11	2	19EX Wall #18	1.0	2.9	254	0.0	0.0	8.19	458
11	2	20EX Wall #19	1.0	2.2	323	0.2	4146	7.23	379
11	2	21EX Wall #20	1.0	0.0	0.0	1.4	649	0.00	461
11	2	22EX Wall #21	1.0	3.9	192	0.0	0.0	11.19	458
11	2	23EX Wall #22	1.0	0.7	1011	0.7	1223	1.60	446
11	2	24EX Wall #23	1.0	0.0	0.0	0.7	1302	0.00	453
11	3	25EX Wall #24	1.0	0.0	***	0.0	0.0	0.09	456
11	3	26EX Wall #25	1.0	3.7	202	1.7	549	9.98	454
11	3	27EX Wall #26	1.0	3.9	194	0.0	0.0	11.10	458
11	3	28EX Wall #27	1.0	0.0	0.0	0.0	0.0	0.00	459
11	3	29EX Wall #28	1.0	0.0	0.0	1.5	629	0.00	459
11	3	30EX Wall #29	1.0	0.0	0.0	0.0	0.0	0.00	450
11	3	31EX Wall #30	1.0	5.6	142	0.0	0.0	16.35	444
11	3	32EX Wall #31	1.0	4.7	164	4.7	212	11.62	457
11	3	33EX Wall #32	1.0	2.1	341	0.0	0.0	5.90	457
11	3	34EX Wall #33	1.0	4.8	161	0.6	1859	13.69	451
11	3	35EX Wall #34	1.0	3.7	202	0.0	0.0	10.65	455
11	3	36EX Wall #35	1.0	0.0	0.0	1.7	549	0.00	453
11	7	37EX Wall #36	1.0	4.7	164	0.0	0.0	13.50	455

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Protocol #:11	Smears H-3 & C-14	User : EaglePicher / ES
		#-3 C-14
P#PID S# SNPL_ID TIME	CPHAA:2S% CPMBB:2S%	DPM1 DPM2 tSIE FLAG
11 7 38EX Wall #37 1.0	3.9 191 0.5 1934	11.05 0.00 459
11 7 39EX Wall #38 1.0	4.7 164 0.0 0.0	13.43 0.00 459
11 7 40EX Wall #39 1.0	0.0 0.0 0.0 0.0	0.00 0.00 457
11 7 41EX Wall #40 1.0	0.0 0.0 0.0 0.0	0.00 0.00 448

4.3.4 SU004-High Roof

Roofing material in the northwest corner of the roof was removed as contaminated material and shipped to a radwaste disposal site. In addition the vent stacks (Figure 4-4) that served the lab area and extended through the roof were removed as contaminated material and shipped to a radwaste disposal site. The roof was then surveyed as a Class 2 survey area.

Summary results are provided in Table 4-5 which is followed by the survey package, a survey map, survey data sheets, charts presenting the survey data, instrument download reports and the smear results from the Packard Tri-Carb Liquid Scintillation counter.

Table 4-5: SU004 Summary Results

Summary Survey Unit 004 High Roof, Class 1	Beta	Beta Scan	H-3 Smear (dpm/100cm ²)	C-14 Smear (dpm/100cm ²)
	Fixed Reading (dpm/100cm ²)	Maximums* (dpm/100cm ²)		
Number	28	2	28	28
Average	3,105	5,758	9	4
Standard Deviation	1,715	N/A	10	6
Maximum	7,200	7,200	46	22

*Beta scan maximum results include maximum data from fixed readings.



Figure 4-4 SU004 Vent Stacks on High Roof



FSS Survey Package Worksheet for
EaglePicher SU004

Package Identification No.: SU04F/SU04S	Prepared by: Paul C. Ely
Location: Building High Roof	Date Prepared: 9/30/2009
Area Classification: Class 2	Signature: <i>Paul Ely</i>

Area Description

The survey area includes the building high roof.

Historical Information

Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3.

General Survey Instructions

1. Use gas proportional detector model numbers 43-68, or equivalent detector as approved by the ES PM for beta surface activity surveys. The total instrument efficiency should use the following factors:
 - ϵ_i , 2π instrument efficiency from calibration papers. If a 4π efficiency is reported, calculate the 2π efficiency as follows using a 5% beta Back Scatter factor (BS). $\epsilon_i = (2 * \epsilon_{4\pi}) \setminus (1 + BS)$
 - ϵ_s , the beta surface efficiency is 25%.
 - ϵ_t , the total beta efficiency = $\epsilon_i * \epsilon_s$
2. Perform surface scans at a scan speed of 1 probe width per second or less for the 43-68. Any locations that exceed 2,500 cpm beta above background should be marked with a felt tip pen or equivalent and the extent of the elevated area recorded.
 - 25% scan of roof for beta contamination.
3. Perform direct beta surface activity measurements at each measurement location. Mark the survey locations with a felt tip pen or equivalent. All surveys locations are referenced from the southwest corner of the survey unit. Systematic survey locations were generated for this class 2 survey unit.
4. Collect a removable surface activity sample (smear) over an area of 100 cm² in size at each measurement location provided on survey maps and place the smear in a liquid scintillation vial immediately after it was taken.

Special Instructions

- | | |
|--|---|
| <ul style="list-style-type: none"> • Source check instrumentation to C-14 for beta measurements. • The static MDC for total beta activity measurements shall be less than 3,000 dpm/100 cm². • Perform a minimum of three one-minute field backgrounds using the plastic shield on the survey surface. • Log scan measurements or record maximum scan measurement results in cpm on a Grid Scan Record. | <ul style="list-style-type: none"> • Measurement and sampling locations are based on a random-start rectangular pattern. If any location is inaccessible, offset the measurement location to the nearest usable location and document the x and y coordinates for the location used. • The attached map provides roof measurement and sampling locations. |
|--|---|

Survey Performance (Initial and date as each item is completed)

[illegible]

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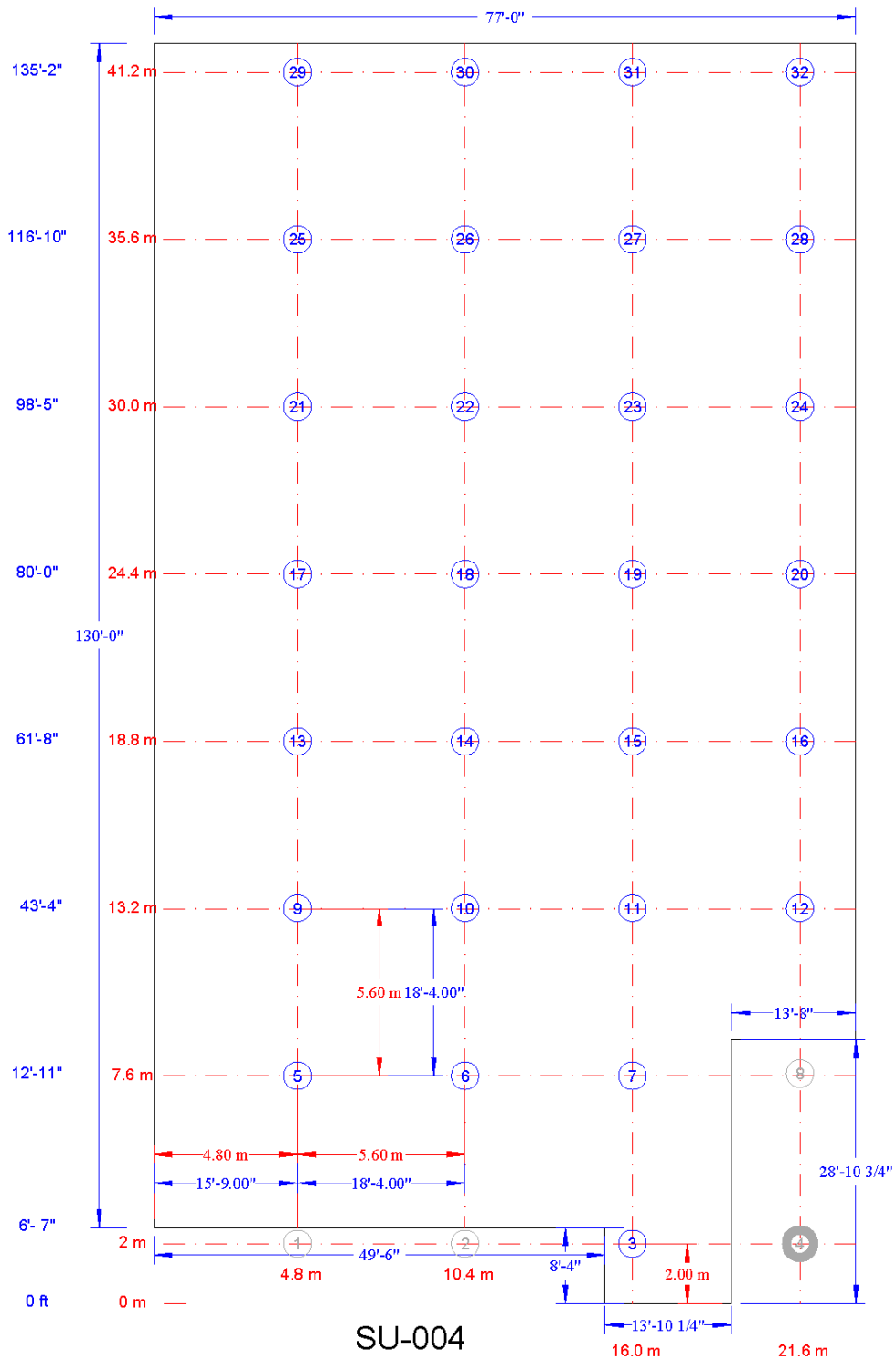


Figure 4-5 SU004 Survey Map

Final Status Survey Report for EaglePicher, Lenexa, Kansas

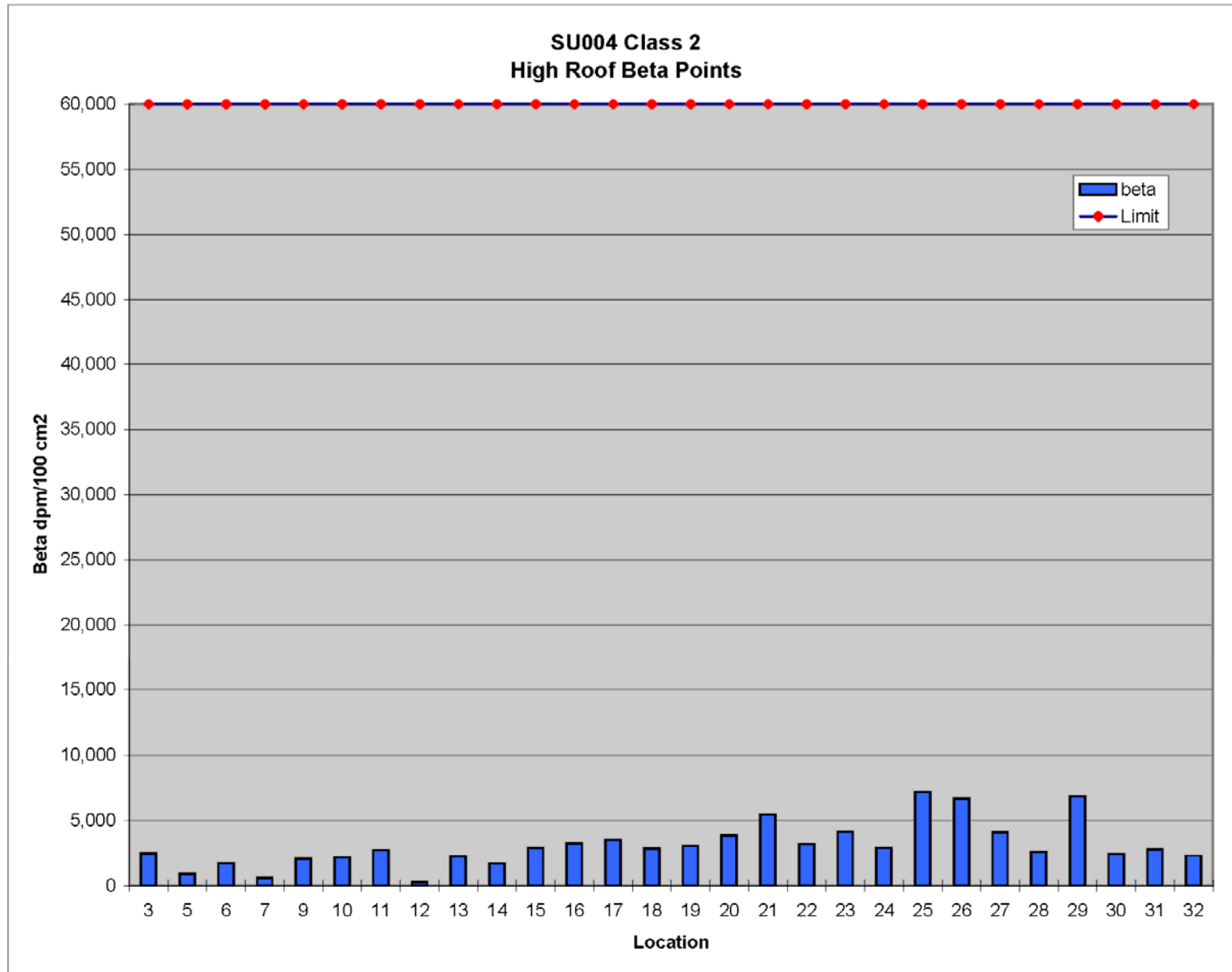
CS-HP-PN-018
Revision 1

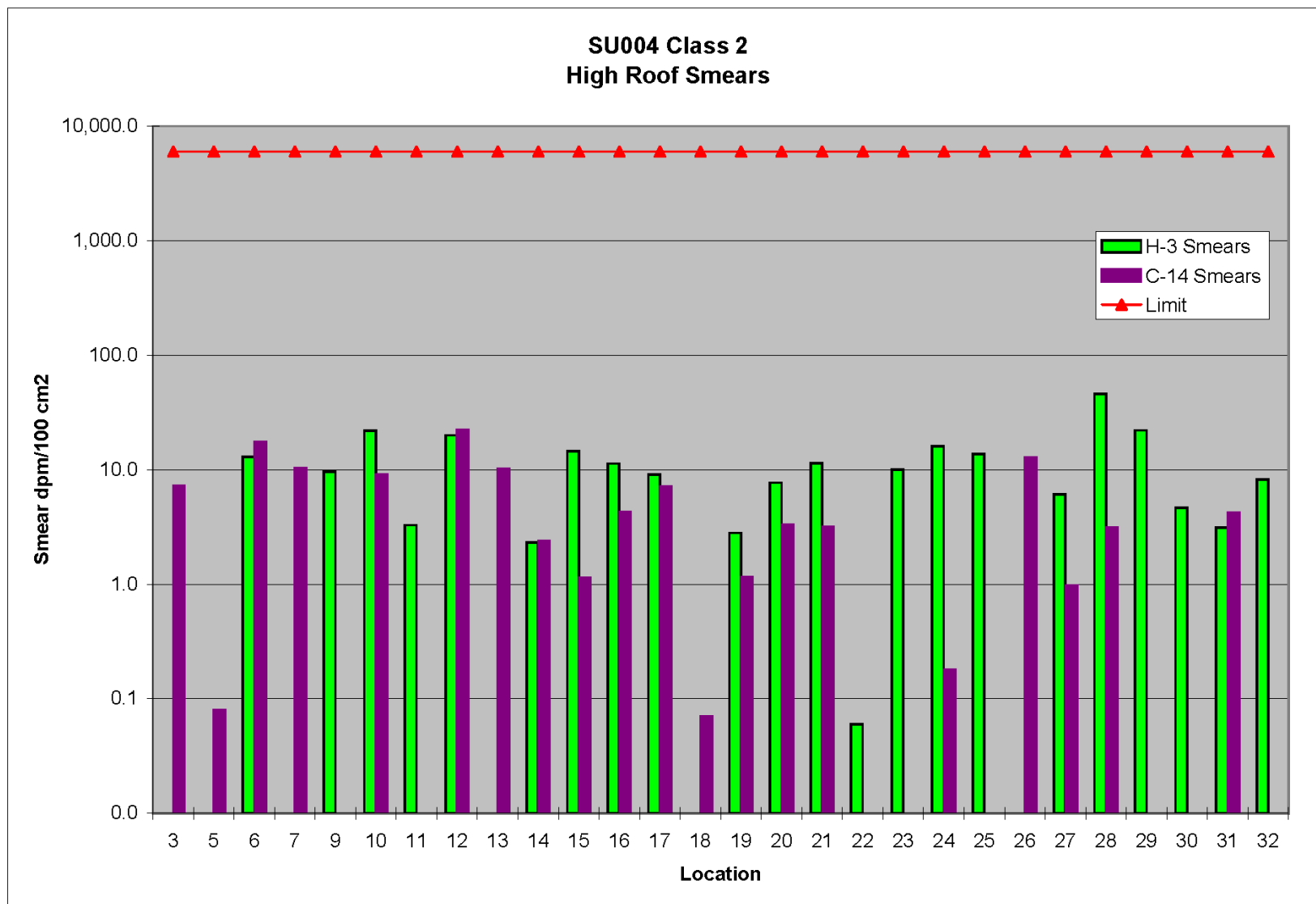
EaglePicher FSS Data Sheet
Survey Unit 004
High Roof

Detector Type	Detector SN	Detector (cm ²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 43-68 (beta)	119337	126	9/30/10	2350-1	95359	9/30/10
Packard Tri-Carb B2555	401663	NA	Daily	NA	NA	NA

Survey			Beta		H-3		C-14
			Fixed Reading	Limit	Smear	Limit	Smear
Point	Loc.*		(dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)
3	R	Roof	2,488	60,000	0.0	6,000	7.3
5	R	Roof	922	60,000	0.0	6,000	0.1
6	R	Roof	1,743	60,000	13.0	6,000	17.6
7	R	Roof	626	60,000	0.0	6,000	10.3
9	R	Roof	2,090	60,000	9.6	6,000	0.0
10	R	Roof	2,158	60,000	21.9	6,000	9.1
11	R	Roof	2,716	60,000	3.3	6,000	0.0
12	R	Roof	245	60,000	20.0	6,000	22.3
13	R	Roof	2,259	60,000	0.0	6,000	10.1
14	R	Roof	1,692	60,000	2.3	6,000	2.4
15	R	Roof	2,868	60,000	14.5	6,000	1.1
16	R	Roof	3,241	60,000	11.3	6,000	4.3
17	R	Roof	3,520	60,000	9.1	6,000	7.2
18	R	Roof	2,843	60,000	0.0	6,000	0.1
19	R	Roof	3,063	60,000	2.8	6,000	1.2
20	R	Roof	3,858	60,000	7.7	6,000	3.3
21	R	Roof	5,440	60,000	11.4	6,000	3.2
22	R	Roof	3,164	60,000	0.1	6,000	0.0
23	R	Roof	4,137	60,000	10.1	6,000	0.0
24	R	Roof	2,902	60,000	16.0	6,000	0.2
25	R	Roof	7,200	60,000	13.7	6,000	0.0
26	R	Roof	6,659	60,000	0.0	6,000	12.8
27	R	Roof	4,112	60,000	6.1	6,000	1.0
28	R	Roof	2,581	60,000	46.0	6,000	3.1
29	R	Roof	6,847	60,000	22.0	6,000	0.0
30	R	Roof	2,462	60,000	4.7	6,000	0.0
31	R	Roof	2,792	60,000	3.1	6,000	4.2
32	R	Roof	2,310	60,000	8.2	6,000	0.0
Average	R	Roof	3,105		9.2		4.3
Standard Deviation	R	Roof	1,715		10.0		5.8
Maximum	R	Roof	7,200		46.0		22.3

* R = Roof, F = Floor, W = Wall, C = Ceiling, E = Equipment







M2350-1 Download BETA Report

File Name : 00000029		Survey Description : SU004 Roof Points	
Survey Reason : Final Status			
User ID : RPS2366		Technician Name : Richard Stoney	
Instrument Model : 2350-1	Instrument S/N : 95359	Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b	Detector S/N : 119337	Detector Cal. Due : 9/30/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm ² Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0938	Survey Date : 10/24/2009	
Minimum Net DPM Observed : -262	Mean Net DPM: 5968		
Maximum Net DPM Observed: 34868	STDEV Observed: 9699	# of Samples Taken: 39	

Richard Stoney
Print Name

Signature

Date

Print Name

Signature

Date

Comments: All Scans Performed results <1000cpm above Background. This is equivalent to 4,315 dpm/100 cm².
 $1000 \text{ cpm} - 490 \text{ cpm background} = 510 \text{ cpm}$
 $510 \text{ cpm} \div 0.0938 \text{ cpm/dpm (Efficiency)} \div 126 \text{ cm}^2 \times 100 \text{ cm}^2 = 4,315 \text{ dpm/100 cm}^2$
PEly

Sign-Off

Print Name

Signature

Date

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000029

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
ZZZZ	ZZZZ	0	2,949.0	600	PRBBK	ZZZZ	ZZZZ	14	0	2,495
ZZZZ	ZZZZ	1	2,829.0	600	PRBBK	ZZZZ	ZZZZ	15	0	2,394
ZZZZ	ZZZZ	2	3,972.0	60	PRSC1	ZZZZ	ZZZZ	16	0	33,807
ZZZZ	ZZZZ	3	3,870.0	60	PRSC1	ZZZZ	ZZZZ	17	0	32,744
ZZZZ	ZZZZ	4	4,040.0	60	PRSC1	ZZZZ	ZZZZ	18	0	34,183
ZZZZ	ZZZZ	5	4,121.0	60	PRSC1	ZZZZ	ZZZZ	19	0	34,868
ZZZZ	ZZZZ	6	2,868.0	600	PRBBK	ZZZZ	ZZZZ	20	0	2,257
SU004	F01	7	459.0	60	FLDBK	ZZZZ	ZZZZ	21	490	-262
SU004	F01	8	784.0	60	FLDCT	ZZZZ	ZZZZ	3	490	2,488
SU004	F01	9	564.0	60	FLDCT	ZZZZ	ZZZZ	7	490	826
SU004	F01	10	698.0	60	FLDCT	ZZZZ	ZZZZ	6	490	1,743
SU004	F01	11	599.0	60	FLDCT	ZZZZ	ZZZZ	5	490	922
SU004	F01	12	737.0	60	FLDCT	ZZZZ	ZZZZ	8	490	2,090
SU004	F01	13	745.0	60	FLDCT	ZZZZ	ZZZZ	10	490	2,158
SU004	F01	14	811.0	60	FLDCT	ZZZZ	ZZZZ	11	490	2,718
SU004	F01	15	519.0	60	FLDCT	ZZZZ	ZZZZ	12	490	245
SU004	F01	16	757.0	60	FLDCT	ZZZZ	ZZZZ	13	490	2,259
SU004	F01	17	690.0	60	FLDCT	ZZZZ	ZZZZ	14	490	1,692
SU004	F01	18	829.0	60	FLDCT	ZZZZ	ZZZZ	15	490	2,868
SU004	F01	19	873.0	60	FLDCT	ZZZZ	ZZZZ	16	490	3,241
SU004	F01	20	906.0	60	FLDCT	ZZZZ	ZZZZ	17	490	3,520
SU004	F01	21	826.0	60	FLDCT	ZZZZ	ZZZZ	18	490	2,843
SU004	F01	22	852.0	60	FLDCT	ZZZZ	ZZZZ	19	490	3,063
SU004	F01	23	946.0	60	FLDCT	ZZZZ	ZZZZ	20	490	3,858
SU004	F01	24	1,133.0	60	FLDCT	ZZZZ	ZZZZ	21	490	5,440
SU004	F01	25	864.0	60	FLDCT	ZZZZ	ZZZZ	22	490	3,164
SU004	F01	26	979.0	60	FLDCT	ZZZZ	ZZZZ	23	490	4,137
SU004	F01	28	865.0	60	FLDCT	ZZZZ	ZZZZ	25	490	3,173
SU004	F01	29	833.0	60	FLDCT	ZZZZ	ZZZZ	24	490	2,902
SU004	F01	30	1,341.0	60	FLDCT	ZZZZ	ZZZZ	25	490	7,200
SU004	F01	31	1,277.0	60	FLDCT	ZZZZ	ZZZZ	26	490	6,659
SU004	F01	32	978.0	60	FLDCT	ZZZZ	ZZZZ	27	490	4,112
SU004	F01	33	795.0	60	FLDCT	ZZZZ	ZZZZ	28	490	2,581
SU004	F01	34	1,311.0	60	FLDCT	ZZZZ	ZZZZ	29	490	6,947
SU004	F01	35	781.0	60	FLDCT	ZZZZ	ZZZZ	30	490	2,462
SU004	F01	36	820.0	60	FLDCT	ZZZZ	ZZZZ	31	490	2,792
SU004	F01	37	763.0	60	FLDCT	ZZZZ	ZZZZ	32	490	2,310
SU004	F01	38	512.0	60	FLDBK	ZZZZ	ZZZZ	33	490	186
SU004	F01	39	499.0	60	FLDBK	ZZZZ	ZZZZ	0	490	76

Beta Flag

45000 -

Beta Max Flag

60000

Saturday, October 24, 2009

Page 2 of 2

**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

26 Oct 2009 15:43 ALPHA/BETA - 1.09 Page #1
Protocol #:11 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Background Subtract: 1st Vial Low Energy: 3H
High Energy: 14C

	LL	UL	LCR	2S%	BKG
Region A:	0.0 - 12.0		0	0.0	8.98
Region B:	12.0 - 156		0	0.0	17.94
Region C:	0.0 - 0.0		0	0.0	0.00

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA11.DAT

P#	PID	S#	SMPL_ID	TIME	CPMA A:2S%	CPMB B:2S%	DPM1	DPM2	tS
11	1	1		10.00	8.98 21.10	17.94 14.93			424.
38	B								
11	1	2	SU4 3	1.00	0.27 2378	5.81 173.9	0.00	7.28	362.
48									
11	1	3	SU4 5	1.00	0.00 0.00	0.06 14398	0.00	0.08	348.
01									
11	1	4	SU4 6	1.00	6.18 129.7	14.90 78.98	13.00	17.57	409.
82									
11	1	5	SU4 7	1.00	0.00 0.00	8.06 130.8	0.00	10.33	306.
79									
11	1	6	SU4 9	1.00	3.02 237.9	0.00 0.00	9.60	0.00	401.
36									
11	1	7	SU4 10	1.00	8.04 105.3	8.35 127.0	21.89	9.07	403.
65									
11	1	8	SU4 11	1.00	1.02 648.0	0.00 0.00	3.28	0.00	396.
49									
11	1	9	SU4 12	1.00	9.02 96.40	19.06 65.35	20.03	22.28	411.
47									
11	1	10	SU4 13	1.00	0.89 739.0	8.19 129.0	0.00	10.13	378.
17									
11	1	11	SU4 14	1.00	1.02 648.0	2.06 452.8	2.31	2.40	409.
42									
11	1	12	SU4 15	1.00	4.54 167.2	1.54 599.1	14.50	1.14	380.
69									
11	2	13	SU4 16	1.00	4.11 181.9	3.97 245.4	11.32	4.26	403.
64									
11	2	14	SU4 17	1.00	3.82 193.6	6.26 162.9	9.05	7.17	420.
98									
11	2	15	SU4 18	1.00	0.02 33329	0.06 14398	0.03	0.07	412.
86									
11	2	16	SU4 19	1.00	1.02 648.0	1.06 858.9	2.80	1.15	398.
78									
11	2	17	SU4 20	1.00	3.02 237.9	3.06 311.9	7.70	3.32	435.
78									
11	2	18	SU4 21	1.00	3.99 186.6	3.09 309.3	11.36	3.19	401.
94									
11	2	19	SU4 22	1.00	0.02 33329	0.00 0.00	0.06	0.00	402.
21									

**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

18	11	2	21	SU4 24	1.00	5.23	148.6	0.85	1069	16.04	0.18	407.
44	11	2	22	SU4 25	1.00	4.68	163.1	0.00	0.00	13.73	0.00	440.
55	11	2	23	SU4 26	1.00	0.93	704.6	10.15	107.7	0.00	12.81	307.
07	11	2	24	SU4 27	1.00	2.02	341.7	1.06	858.9	6.07	0.98	394.
28	11	3	25	SU4 28	1.00	15.51	64.96	4.57	215.9	46.01	3.12	413.
91	11	3	26	SU4 29	1.00	7.02	117.1	0.00	0.00	22.03	0.00	406.
91	11	3	27	SU4 30	1.00	1.55	434.9	0.00	0.00	4.66	0.00	427.
11	11	3	28	SU4 31	1.00	1.52	444.3	3.56	271.1	3.12	4.19	425.
50	11	3	29	SU4 32	1.00	2.82	252.4	0.26	3481	8.20	0.00	439.
42												

H-3 C-14
DPM-1 DPM-2

4.3.5 SU005-Low Roof

This was a Class 3 survey unit.

Summary results are provided in Table 4-6 which is followed by the survey package, a survey map, survey data sheets, charts presenting the survey data, instrument download reports and the smear results from the Packard Tri-Carb Liquid Scintillation counter.

Table 4-6: SU005 Summary Results

Summary Survey Unit 005 Low Roof, Class 3	Beta	Beta Scan	H-3 Smear (dpm/100cm ²)	C-14 Smear (dpm/100cm ²)
	Fixed Reading (dpm/100cm ²)	Maximums* (dpm/100cm ²)		
Number	30	2	30	30
Average	1,729	3,431	3	3
Standard Deviation	480	N/A	13	3
Maximum	2,758	4,104	71	12

*Beta scan maximum results include maximum data from fixed readings.



FSS Survey Package Worksheet for
EaglePicher SU005

Package Identification No.: SU05F/SU05S	Prepared by: Paul C. Ely
Location: Building Low Roof	Date Prepared: 9/30/2009
Area Classification: Class 3	Signature: <i>Paul Ely</i>

Area Description

The survey area includes the Building Low Roof.

Historical Information

Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3.

General Survey Instructions

- Use gas proportional detector model numbers 43-68, or equivalent detector as approved by the ES PM for beta surface activity surveys. The total instrument efficiency should use the following factors:
 - ϵ_i , 2π instrument efficiency from calibration papers. If a 4π efficiency is reported, calculate the 2π efficiency as follows using a 5% beta Back Scatter factor (BS). $\epsilon_i = (2 * \epsilon_{4\pi}) \backslash (1 + BS)$
 - ϵ_s , the beta surface efficiency is 25%.
 - ϵ_t , the total beta efficiency = $\epsilon_i * \epsilon_s$
- Perform surface scans at a scan speed of 1 probe width per second or less for the 43-68. Any locations that exceed 2,500 cpm beta above background should be marked with a felt tip pen or equivalent and the extent of the elevated area recorded.
 - 25% scan of roof for beta contamination.
- Perform direct beta surface activity measurements at each measurement location. Mark and the survey location on the walls with a felt tip pen or equivalent. All surveys locations are referenced from the southwest corner of the survey unit. Random survey locations were generated for this class 3 survey unit.
- Collect a removable surface activity sample (smear) over an area of 100 cm² in size at each measurement location provided on survey maps and place the smear in a liquid scintillation vial immediately after it was taken. The roof has a graveled surface and will not be easy to smear.

Special Instructions

- Source check instrumentation to C-14 for beta measurements.
- The static MDC for total beta activity measurements shall be less than 3,000 dpm/100 cm².
- Perform a minimum of three one-minute field backgrounds using the plastic shield on the survey surface.
- Log scan measurements or record maximum scan measurement results in cpm on a Grid Scan Record.
- Randomly generated measurement and sampling locations are indicated on the attached survey map. If any location is inaccessible, offset the measurement location to the nearest usable location and mark the survey location on the map.
- The attached map provides measurement and sampling locations.

Survey Performance (Initial and date as each item is completed)

[illegible]

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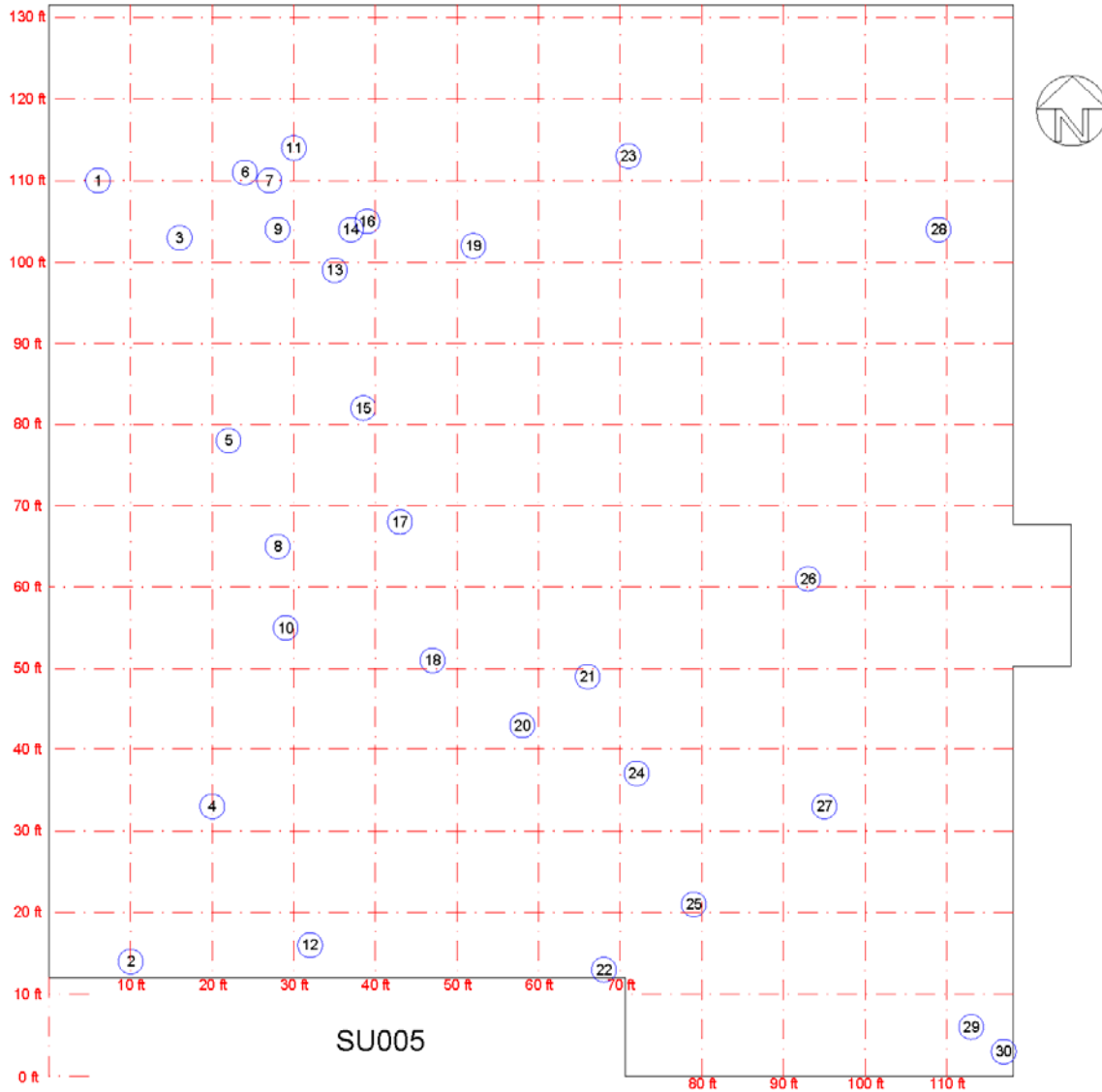


Figure 4-6 SU005 Survey Map

Final Status Survey Report for EaglePicher, Lenexa, Kansas

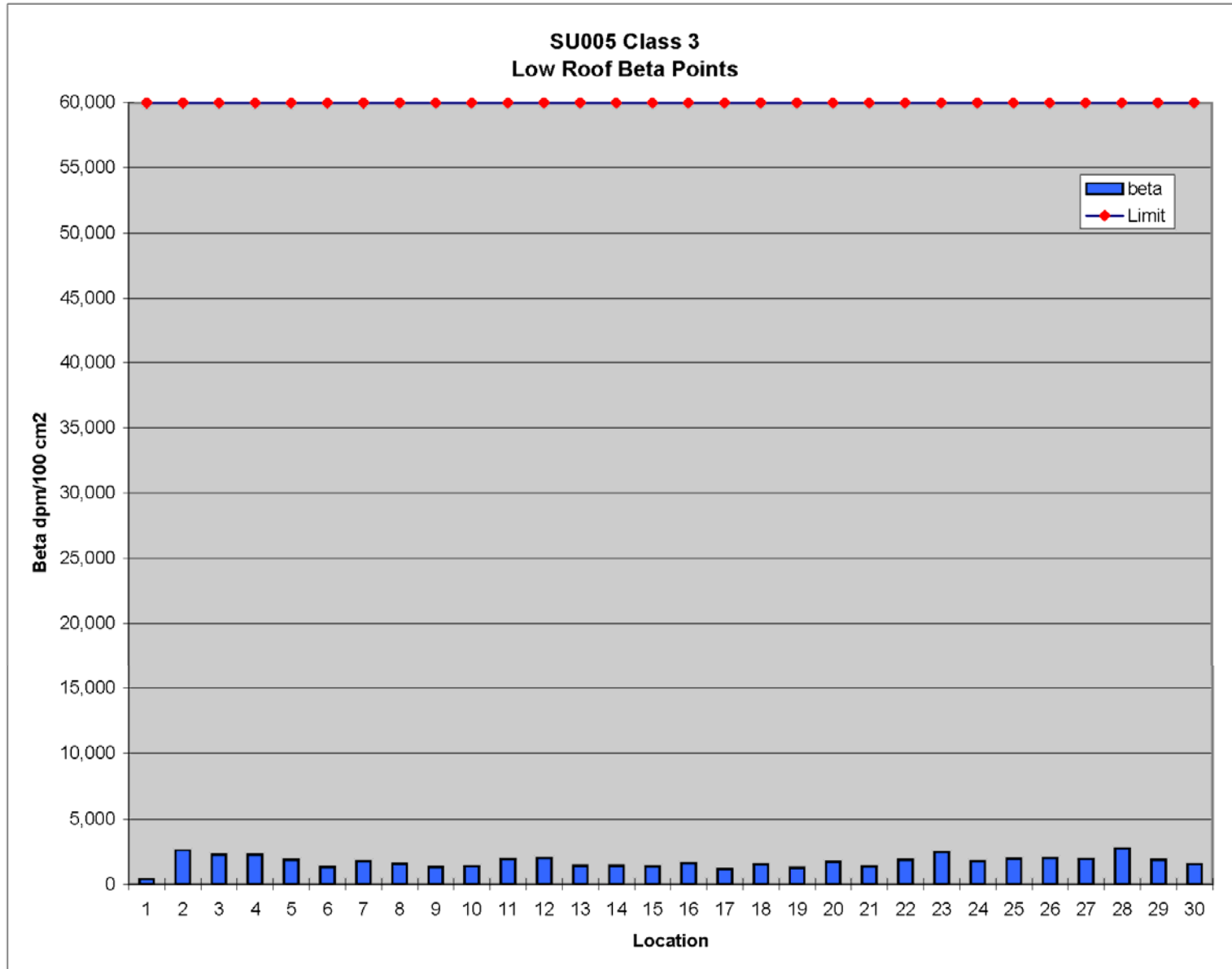
CS-HP-PN-018
Revision 1

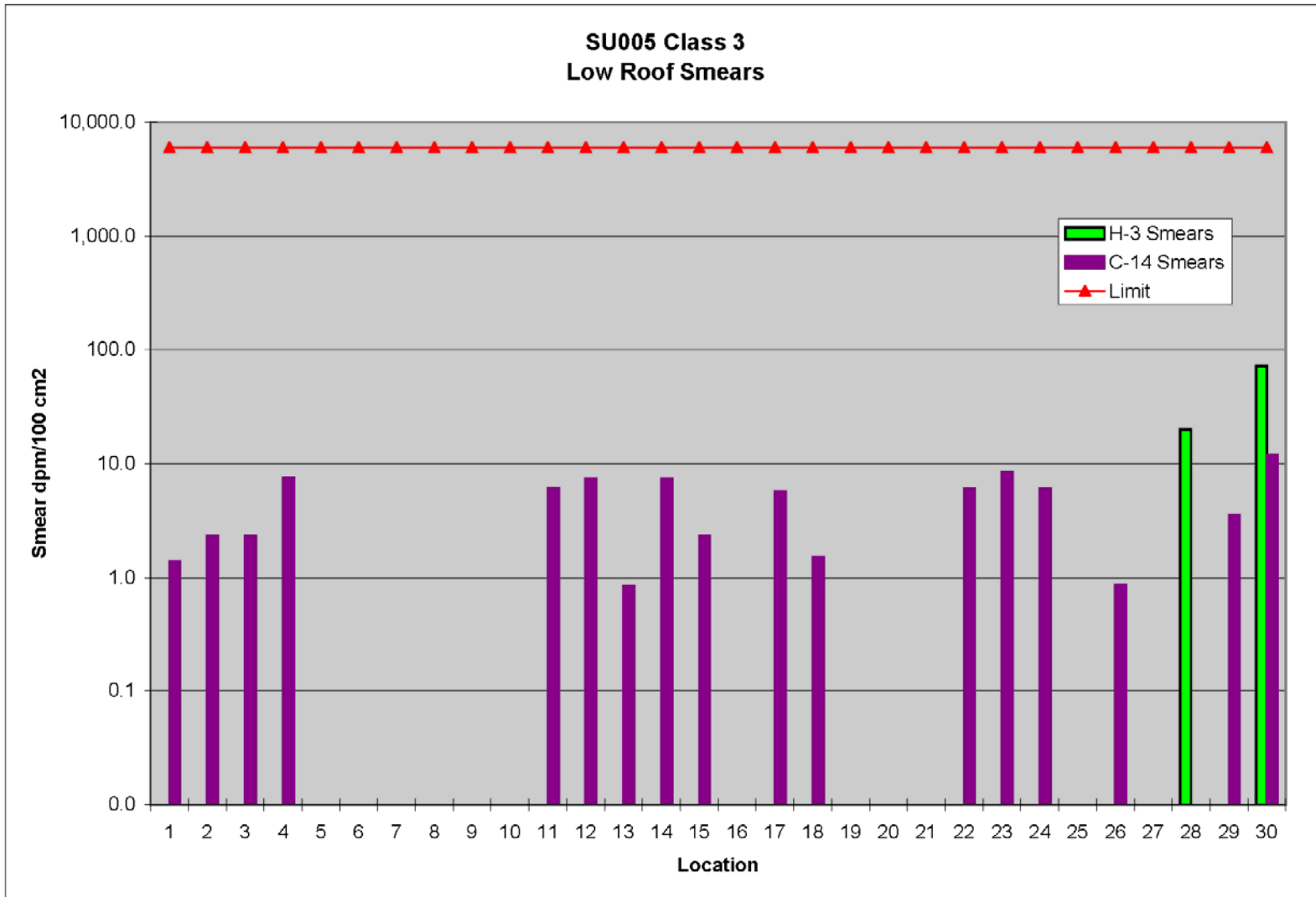
EaglePicher FSS Data Sheet
Survey Unit 005
Low Roof

Detector Type	Detector SN	Detector (cm²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 43-68 (beta)	119337	126	9/30/10	2350-1	95359	9/30/10
Packard Tri-Carb B2555	401663	NA	Daily	NA	NA	NA

Survey Point	Loc.*		Beta		H-3		C-14
			Fixed Reading (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)
1	R	Roof	381	60,000	0.0	6,000	1.4
2	R	Roof	2,606	60,000	0.0	6,000	2.3
3	R	Roof	2,284	60,000	0.0	6,000	2.3
4	R	Roof	2,284	60,000	0.0	6,000	7.4
5	R	Roof	1,870	60,000	0.0	6,000	0.0
6	R	Roof	1,320	60,000	0.0	6,000	0.0
7	R	Roof	1,785	60,000	0.0	6,000	0.0
8	R	Roof	1,557	60,000	0.0	6,000	0.0
9	R	Roof	1,328	60,000	0.0	6,000	0.0
10	R	Roof	1,396	60,000	0.0	6,000	0.0
11	R	Roof	1,921	60,000	0.0	6,000	6.1
12	R	Roof	2,039	60,000	0.0	6,000	7.3
13	R	Roof	1,413	60,000	0.0	6,000	0.9
14	R	Roof	1,421	60,000	0.0	6,000	7.4
15	R	Roof	1,379	60,000	0.0	6,000	2.3
16	R	Roof	1,608	60,000	0.0	6,000	0.0
17	R	Roof	1,185	60,000	0.0	6,000	5.7
18	R	Roof	1,515	60,000	0.0	6,000	1.5
19	R	Roof	1,269	60,000	0.0	6,000	0.0
20	R	Roof	1,718	60,000	0.0	6,000	0.0
21	R	Roof	1,379	60,000	0.0	6,000	0.0
22	R	Roof	1,887	60,000	0.0	6,000	6.1
23	R	Roof	2,454	60,000	0.0	6,000	8.5
24	R	Roof	1,760	60,000	0.0	6,000	6.1
25	R	Roof	1,963	60,000	0.0	6,000	0.0
26	R	Roof	2,014	60,000	0.0	6,000	0.9
27	R	Roof	1,955	60,000	0.0	6,000	0.0
28	R	Roof	2,758	60,000	19.9	6,000	0.0
29	R	Roof	1,870	60,000	0.0	6,000	3.6
30	R	Roof	1,548	60,000	71.2	6,000	11.9
Average	R	Roof	1,729		3		3
Standard Deviation	R	Roof	480		13		3
Maximum	R	Roof	2,758		71		12

* R = Roof, F = Floor, W = Wall, C = Ceiling, E = Equipment







M2350-1 Download BETA Report

File Name : 00000030		Survey Description : SU005 Points 1-30 on Roof	
Survey Reason : Final Status			
User ID : RPS2366		Technician Name : Richard Stoney	
Instrument Model : 2350-1	Instrument S/N : 95359	Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b	Detector S/N : 119337	Detector Cal. Due : 9/30/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm ² Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0938	Survey Date : 10/24/2009	
Minimum Net DPM Observed : -1476	Mean Net DPM : 2342		
Maximum Net DPM Observed : 31568	STDEV Observed : 5154	# of Samples Taken : 35	

Richard Stoney
Print Name

Signature

Date

Print Name

Signature

Date

Comments:

All Scan Results < 1000 cpm/per probe area.
This is equivalent to 4,104 dpm/100 cm². 1,000 cpm = 515 cpm (background)
= 485 dpm. 485 cpm ÷ 0.0938 cpm/dpm (Efficiency) ÷ 126 cm²
x 100 cm² = 4,104 dpm/100 cm². PEG

Sign-Off

Print Name

Signature

Date

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000030

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU005	F01	0	499.0	60	FLDBK	ZZZZZ	ZZZZZ	1	515	-135
SU005	F01	1	823.0	60	FLDCT	ZZZZZ	ZZZZZ	2	515	2,606
SU005	F01	2	786.0	60	FLDGT	ZZZZZ	ZZZZZ	4	515	2,284
SU005	F01	3	756.0	60	FLDCT	ZZZZZ	ZZZZZ	12	515	2,039
SU005	F01	4	738.0	60	FLDCT	ZZZZZ	ZZZZZ	22	515	1,887
SU005	F01	5	747.0	60	FLDCT	ZZZZZ	ZZZZZ	25	515	1,963
SU005	F01	6	746.0	60	FLDCT	ZZZZZ	ZZZZZ	27	515	1,955
SU005	F01	7	723.0	60	FLDCT	ZZZZZ	ZZZZZ	24	515	1,760
SU005	F01	8	736.0	60	FLDCT	ZZZZZ	ZZZZZ	29	515	1,870
SU005	F01	9	699.0	60	FLDCT	ZZZZZ	ZZZZZ	30	515	1,548
SU005	F01	10	718.0	60	FLDCT	ZZZZZ	ZZZZZ	20	515	1,718
SU005	F01	11	678.0	60	FLDCT	ZZZZZ	ZZZZZ	21	515	1,379
SU005	F01	12	694.0	60	FLDCT	ZZZZZ	ZZZZZ	18	515	1,515
SU005	F01	13	753.0	60	FLDCT	ZZZZZ	ZZZZZ	26	515	2,014
SU005	F01	14	841.0	60	FLDCT	ZZZZZ	ZZZZZ	28	515	2,758
SU005	F01	15	535.0	60	FLDBK	ZZZZZ	ZZZZZ	26	515	169
SU005	F01	16	805.0	60	FLDCT	ZZZZZ	ZZZZZ	23	515	2,454
SU005	F01	17	665.0	60	FLDCT	ZZZZZ	ZZZZZ	19	515	1,269
SU005	F01	18	705.0	60	FLDCT	ZZZZZ	ZZZZZ	16	515	1,608
SU005	F01	19	682.0	60	FLDCT	ZZZZZ	ZZZZZ	13	515	1,413
SU005	F01	20	683.0	60	FLDCT	ZZZZZ	ZZZZZ	14	515	1,421
SU005	F01	21	672.0	60	FLDCT	ZZZZZ	ZZZZZ	9	515	1,328
SU005	F01	22	671.0	60	FLDCT	ZZZZZ	ZZZZZ	6	515	1,320
SU005	F01	23	726.0	60	FLDCT	ZZZZZ	ZZZZZ	7	515	1,785
SU005	F01	24	742.0	60	FLDCT	ZZZZZ	ZZZZZ	11	515	1,921
SU005	F01	25	785.0	60	FLDCT	ZZZZZ	ZZZZZ	3	515	2,284
SU005	F01	26	560.0	60	FLDCT	ZZZZZ	ZZZZZ	1	515	381
SU005	F01	27	736.0	60	FLDCT	ZZZZZ	ZZZZZ	5	515	1,870
SU005	F01	28	678.0	60	FLDCT	ZZZZZ	ZZZZZ	15	515	1,379
SU005	F01	29	655.0	60	FLDCT	ZZZZZ	ZZZZZ	17	515	1,185
SU005	F01	30	699.0	60	FLDCT	ZZZZZ	ZZZZZ	8	515	1,557
SU005	F01	31	680.0	60	FLDCT	ZZZZZ	ZZZZZ	10	515	1,396
SU005	F01	32	511.0	60	FLDBK	ZZZZZ	ZZZZZ	10	515	-34
SU005	F01	33	3,406.0	600	PTBBK	ZZZZZ	ZZZZZ	11	515	-1,476
SU005	F01	34	4,246.0	60	PTSC1	ZZZZZ	ZZZZZ	12	515	31,568

Beta Flag

45000 -

Beta Max Flag

60000

Saturday, October 24, 2009

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**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

26 Oct 2009 14:31 ALPHA/BETA - 1.09 Page #1
Protocol #:24 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Background Subtract: 1st Vial Low Energy: 3H
High Energy: 14C

	LL	UL	LCR	2S%	BKG
Region A:	0.0 - 12.0		0	0.0	11.25
Region B:	12.0 - 156		0	0.0	16.15
Region C:	0.0 - 0.0		0	0.0	0.00

Low Roof

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA24.DAT

P#	PID	S#	SMPL_ID	TIME	H-3 CPMA A:2S%	C-14 CPMB B:2S%	H-3 DPM1	C-14 DPM2	ts
24	8	1		10.00	11.25 18.86	16.15 15.74			416.
80	B								
24	8	2	SU5 1	1.00	0.00 0.00	1.10 792.7	0.00	1.39	345.
46									
24	8	3	SU5 2	1.00	0.00 0.00	1.85 479.1	0.00	2.31	409.
54									
24	8	4	SU5 3	1.00	0.00 0.00	1.85 479.1	0.00	2.32	383.
53									
24	8	5	SU5 4	1.00	0.00 0.00	5.85 166.2	0.00	7.43	337.
86									
24	8	6	SU5 5	1.00	0.00 0.00	0.00 0.00	0.00	0.00	412.
26									
24	8	7	SU5 6	1.00	0.00 0.00	0.00 0.00	0.00	0.00	404.
64									
24	8	8	SU5 7	1.00	0.00 0.00	0.00 0.00	0.00	0.00	407.
80									
24	8	9	SU5 8	1.00	0.00 0.00	0.00 0.00	0.00	0.00	373.
73									
24	8	10	SU5 9	1.00	0.00 0.00	0.00 0.00	0.00	0.00	328.
27									
24	8	11	SU5 10	1.00	0.00 0.00	0.00 0.00	0.00	0.00	371.
96									
24	8	12	SU5 11	1.00	0.00 0.00	4.85 196.2	0.00	6.12	357.
47									
24	9	13	SU5 12	1.00	0.00 0.00	5.85 166.2	0.00	7.30	407.
15									
24	9	14	SU5 13	1.00	0.00 0.00	0.66 1300	0.00	0.85	292.
40									
24	9	15	SU5 14	1.00	0.00 0.00	5.85 166.2	0.00	7.38	362.
68									
24	9	16	SU5 15	1.00	0.00 0.00	1.85 479.1	0.00	2.33	358.
43									
24	9	17	SU5 16	1.00	0.00 0.00	0.00 0.00	0.00	0.00	399.
66									
24	9	18	SU5 17	1.00	0.00 0.00	4.53 208.6	0.00	5.70	371.
51									
24	9	19	SU5 18	1.00	0.00 0.00	1.21 721.3	0.00	1.51	386.
12									

**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

24	9	20	SU5 19	1.00	0.00	0.00	0.00	0.00	0.00	0.00	303.
30											
24	9	21	SU5 20	1.00	0.00	0.00	0.00	0.00	0.00	0.00	411.
43											
24	9	22	SU5 21	1.00	0.00	0.00	0.00	0.00	0.00	0.00	426.
36											
24	9	23	SU5 22	1.00	0.00	0.00	4.85	196.2	0.00	6.06	399.
99											
24	9	24	SU5 23	1.00	0.00	0.00	6.83	145.3	0.00	8.52	403.
64											
24	10	25	SU5 24	1.00	0.00	0.00	4.85	196.2	0.00	6.06	398.
43											
24	10	26	SU5 25	1.00	0.00	0.00	0.00	0.00	0.00	0.00	353.
40											
24	10	27	SU5 26	1.00	0.00	0.00	0.69	1239	0.00	0.87	363.
87											
24	10	28	SU5 27	1.00	0.00	0.00	0.00	0.00	0.00	0.00	434.
91											
24	10	29	SU5 28	1.00	5.51	153.4	0.00	0.00	19.90	0.00	351.
34											
24	10	30	SU5 29	1.00	0.00	0.00	2.85	318.8	0.00	3.57	388.
84											
24	10	31	SU5 30	1.00	22.05	53.22	12.55	87.72	71.20	11.88	363.
53											

H-3 C-14
DPM-1 DPM2

4.3.6 SU006-Mezzane Ceiling

This was a Class 3 survey unit.

Summary results are provided in Table 4-7 which is followed by the survey package, a survey map, survey data sheets, charts presenting the survey data, instrument download reports and the smear results from the Packard Tri-Carb Liquid Scintillation counter.

Table 4-7: SU006 Summary Results

Summary Survey Unit 006 Mezzanine Ceiling, Class 3	Beta	Beta Scan Maximums*	H-3 Smear	C-14 Smear
	Fixed Reading (dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)
Number	30	2	30	30
Average	3,478	11,045	16.2	16.6
Standard Deviation	1,747	N/A	9.9	25.1
Maximum	9,210	12,881	37.5	127.9

*Beta scan maximum results include maximum data from fixed readings.



FSS Survey Package Worksheet for
EaglePicher SU006

Package Identification No.: SU06F/SU06S	Prepared by: Paul C. Ely
Location: Ceiling above Mezzanine	Date Prepared: 9/30/2009
Area Classification: Class 3	Signature: <i>Paul C. Ely</i>

Area Description

The survey area includes the ceiling.

Historical Information

Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3.

General Survey Instructions

1. Use gas proportional detector model numbers 43-68, or equivalent detector as approved by the ES PM for beta surface activity surveys. The total instrument efficiency should use the following factors:
 - ϵ_i , 2π instrument efficiency from calibration papers. If a 4π efficiency is reported, calculate the 2π efficiency as follows using a 5% beta Back Scatter factor (BS). $\epsilon_i = (2 * \epsilon_{4\pi}) \backslash (1 + BS)$
 - ϵ_s , the beta surface efficiency is 25%.
 - ϵ_t , the total beta efficiency = $\epsilon_i * \epsilon_s$
2. Perform surface scans at a scan speed of 1 probe width per second or less for the 43-68. Any locations that exceed 2,500 cpm beta above background should be marked with a felt tip pen or equivalent and the extent of the elevated area recorded.
 - 10% scan of ceiling for beta contamination.
3. Perform direct beta surface activity measurements at each measurement location. All ceiling surveys locations are marked on floor. All surveys locations are referenced from the southwest corner of the survey unit. Random survey locations were generated for this class 3 survey unit.
4. Collect a removable surface activity sample (smear) over an area of 100 cm² in size at each measurement location provided on survey maps and place the smear in a liquid scintillation vial immediately after it is taken.

Special Instructions

- Source check instrumentation to C-14 for beta measurements.
- The static MDC for total beta activity measurements shall be less than 3,000 dpm/100 cm².
- Perform a minimum of three one-minute field backgrounds using the plastic shield on the survey surface.
- Log scan measurements or record maximum scan measurement results in cpm on a Grid Scan Record.
- Randomly generated measurement and sampling locations are indicated on the attached survey map. If any location is inaccessible, offset the measurement location to the nearest usable location and mark the survey location on the map.
- The attached map provides ceiling measurement and sampling locations based on marked floor locations.

Survey Performance (Initial and date as each item is completed)

[illegible]

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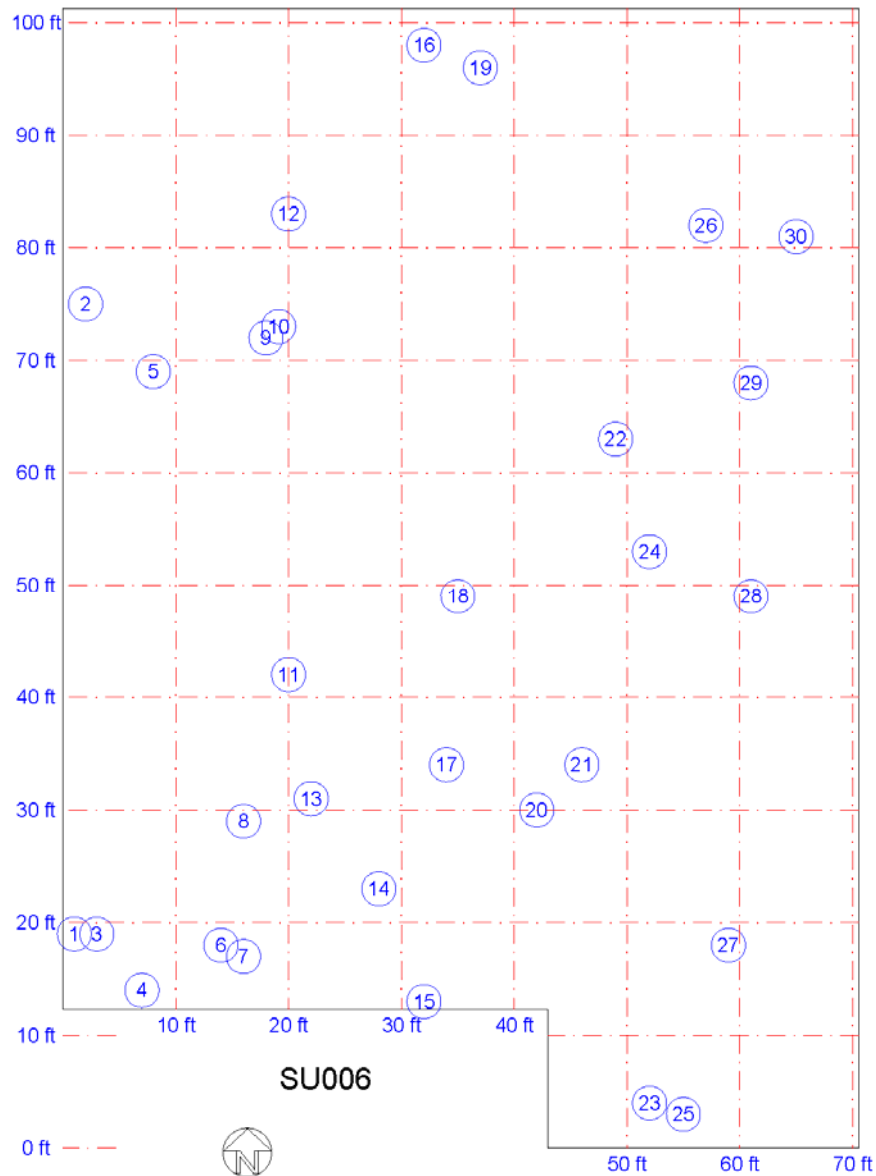


Figure 4-7 SU006 Survey Map

**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

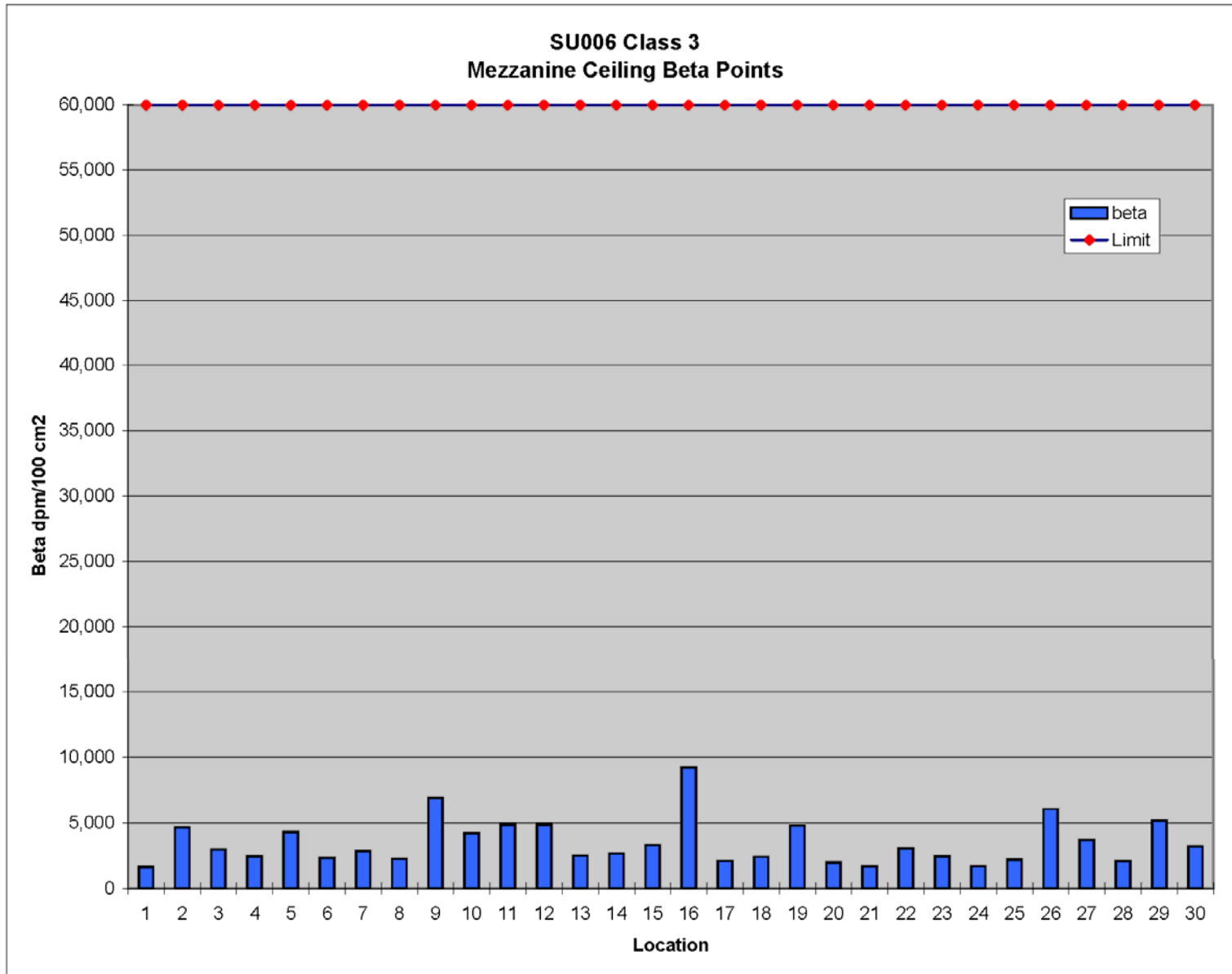
**CS-HP-PN-018
Revision 1**

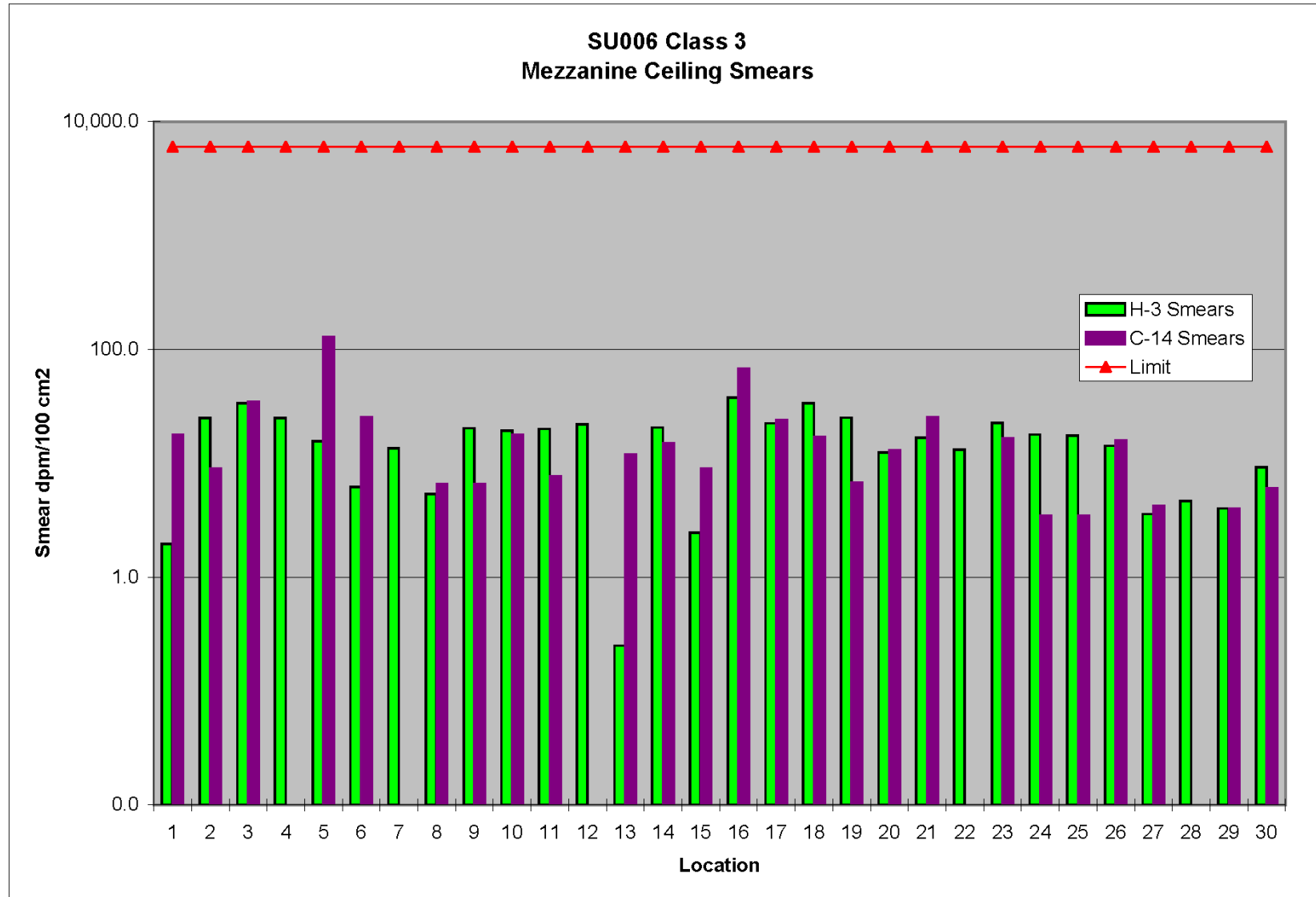
EaglePicher FSS Data Sheet
Survey Unit 006
Mezzanine Ceiling

Detector Type	Detector SN	Detector (cm ²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 43-68 (beta)	091028	126	9/28/10	2350-1	117566	9/28/10
Packard Tri-Carb B2555	401663	NA	Daily	NA	NA	NA

Survey Point	Loc.*		Beta		H-3		C-14
			Fixed Reading (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)
1	C	Ceiling	1,623	60,000	2.0	6,000	17.7
2	C	Ceiling	4,658	60,000	25.0	6,000	8.9
3	C	Ceiling	2,960	60,000	33.5	6,000	34.8
4	C	Ceiling	2,430	60,000	24.9	6,000	0.0
5	C	Ceiling	4,318	60,000	15.6	6,000	127.9
6	C	Ceiling	2,324	60,000	6.2	6,000	25.5
7	C	Ceiling	2,822	60,000	13.5	6,000	0.0
8	C	Ceiling	2,249	60,000	5.4	6,000	6.6
9	C	Ceiling	6,875	60,000	20.3	6,000	6.5
10	C	Ceiling	4,191	60,000	19.3	6,000	17.9
11	C	Ceiling	4,849	60,000	20.0	6,000	7.7
12	C	Ceiling	4,849	60,000	22.1	6,000	0.0
13	C	Ceiling	2,515	60,000	0.3	6,000	12.0
14	C	Ceiling	2,663	60,000	20.6	6,000	15.0
15	C	Ceiling	3,310	60,000	2.5	6,000	8.9
16	C	Ceiling	9,210	60,000	37.5	6,000	68.1
17	C	Ceiling	2,101	60,000	22.5	6,000	23.9
18	C	Ceiling	2,409	60,000	33.8	6,000	16.9
19	C	Ceiling	4,785	60,000	25.1	6,000	6.7
20	C	Ceiling	1,963	60,000	12.4	6,000	12.9
21	C	Ceiling	1,666	60,000	16.8	6,000	25.4
22	C	Ceiling	3,056	60,000	13.2	6,000	0.0
23	C	Ceiling	2,430	60,000	22.5	6,000	16.5
24	C	Ceiling	1,708	60,000	17.8	6,000	3.4
25	C	Ceiling	2,186	60,000	17.5	6,000	3.5
26	C	Ceiling	6,048	60,000	14.2	6,000	15.8
27	C	Ceiling	3,714	60,000	3.6	6,000	4.2
28	C	Ceiling	2,069	60,000	4.7	6,000	0.0
29	C	Ceiling	5,178	60,000	4.0	6,000	4.0
30	C	Ceiling	3,183	60,000	9.2	6,000	6.0
Average		C	Ceiling	3,478		16.2	16.6
Standard Deviation		C	Ceiling	1,747		9.9	25.1
Maximum		C	Ceiling	9,210		37.5	127.9

* R = Roof, F = Floor, W = Wall, C = Ceiling, E = Equipment







M2350-1 Download BETA Report

File Name : 00000035		Survey Description : SU06F Ceiling Points 1-30	
Survey Reason : Final Status			
User ID : RLS2098		Technician Name : Lee Severtson	
Instrument Model : 2350-1	Instrument S/N : 117566	Instrument Cal. Due : 9/28/2010	
Detector Model : 43-68b	Detector S/N : 091028	Detector Cal. Due : 9/28/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm ² Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0748	Survey Date : 10/27/2009	
Minimum Net DPM Observed: -110	Mean Net DPM: 4273		
Maximum Net DPM Observed: 46643	STDEV Observed: 7518	# of Samples Taken: 36	

Lee Severtson
Print Name

[Signature]
Signature

10-28-09
Date

Print Name

Signature

Date

Comments:

no scan readings found > 1500 cpm
This is equivalent to 12,881 dpm/100 cm². 1500 cpm - 286 cpm (background)
= 1214 cpm. 1214 cpm ÷ 0.0748 cpm/dpm (Efficiency) ÷ 126 cm²
x 100 cm² = 12,881 dpm/100 cm². PEE

Sign-Off

Paul Ely
Print Name

[Signature]
Signature

10/29/09
Date

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000035

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU06F	C01	0	280.0	60	FLDBK	B0012	ZZZZZ	1	286	-64
SU06F	C01	1	515.0	60	FLDCT	B0012	ZZZZZ	23	286	2,430
SU06F	C01	2	492.0	60	FLDCT	B0012	ZZZZZ	25	286	2,186
SU06F	C01	3	836.0	60	FLDCT	B0012	ZZZZZ	27	286	3,714
SU06F	C01	4	481.0	60	FLDCT	B0012	ZZZZZ	28	286	2,069
SU06F	C01	5	447.0	60	FLDCT	B0012	ZZZZZ	24	286	1,708
SU06F	C01	6	774.0	60	FLDCT	B0012	ZZZZZ	29	286	5,178
SU06F	C01	7	574.0	60	FLDCT	B0012	ZZZZZ	22	286	3,056
SU06F	C01	8	586.0	60	FLDCT	B0012	ZZZZZ	30	286	3,183
SU06F	C01	9	856.0	60	FLDCT	B0012	ZZZZZ	26	286	6,048
SU06F	C01	10	1,154.0	60	FLDCT	B0012	ZZZZZ	16	286	9,210
SU06F	C01	11	737.0	60	FLDCT	B0012	ZZZZZ	19	286	4,785
SU06F	C01	12	743.0	60	FLDCT	B0012	ZZZZZ	12	286	4,849
SU06F	C01	13	934.0	60	FLDCT	B0012	ZZZZZ	9	286	6,875
SU06F	C01	14	881.0	60	FLDCT	B0012	ZZZZZ	10	286	4,191
SU06F	C01	15	301.0	60	FLDBK	B0012	ZZZZZ	2	286	159
SU06F	C01	16	725.0	60	FLDCT	B0012	ZZZZZ	2	286	4,659
SU06F	C01	17	693.0	60	FLDCT	B0012	ZZZZZ	5	286	4,318
SU06F	C01	18	743.0	60	FLDCT	B0012	ZZZZZ	11	286	4,849
SU06F	C01	19	513.0	60	FLDCT	B0012	ZZZZZ	18	286	2,409
SU06F	C01	20	484.0	60	FLDCT	B0012	ZZZZZ	17	286	2,101
SU06F	C01	21	443.0	60	FLDCT	B0012	ZZZZZ	21	286	1,666
SU06F	C01	22	471.0	60	FLDCT	B0012	ZZZZZ	20	286	1,963
SU06F	C01	23	523.0	60	FLDCT	B0012	ZZZZZ	13	286	2,515
SU06F	C01	24	498.0	60	FLDCT	B0012	ZZZZZ	8	286	2,249
SU06F	C01	25	537.0	60	FLDCT	B0012	ZZZZZ	14	286	2,683
SU06F	C01	26	598.0	60	FLDCT	B0012	ZZZZZ	15	286	3,310
SU06F	C01	27	439.0	60	FLDCT	B0012	ZZZZZ	1	286	1,623
SU06F	C01	28	565.0	60	FLDCT	B0012	ZZZZZ	3	286	2,960
SU06F	C01	29	515.0	60	FLDCT	B0012	ZZZZZ	4	286	2,430
SU06F	C01	30	505.0	60	FLDCT	B0012	ZZZZZ	6	286	2,324
SU06F	C01	31	552.0	60	FLDCT	B0012	ZZZZZ	7	286	2,822
SU06F	C01	32	276.0	60	FLDBK	B0012	ZZZZZ	3	286	-108
SU06F	C01	33	2,756.0	600	PTBBK	B0012	ZZZZZ	4	286	-110
ZZZZZ	ZZZZZ	34	4,395.0	60	PTSC1	B0012	ZZZZZ	5	0	46,643
ZZZZZ	ZZZZZ	35	2,808.0	600	PTBBK	B0012	ZZZZZ	6	0	2,977

Beta Flag 45000 -
Beta Max Flag 60000

Wednesday, October 28, 2009

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**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

28 Oct 2009 09:30 ALPHA/BETA - 1.09 Page #1
Protocol #:25 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Background Subtract: 1st Vial Low Energy: 3H
High Energy: 14C

54006

	LL	UL	LCR	25%	BKG
Region A:	0.0 - 12.0	0	0.0	9.31	
Region B:	12.0 - 156	0	0.0	17.39	
Region C:	0.0 - 0.0	0	0.0	0.00	

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA25.001

P#PID	S#	SMPL_ID	TIME	CPMAA:25%	CPMBB:25%	DPM1	DPM2	tSIE	FLAG	
25	2	1	10.0	9.3	20.7	17.4	15.2	41.6	B	
25	2	2MEZ CEIL SU06-1	1.0	2.7	268	14.6	79.5	1.96	17.71	463
25	2	3MEZ CEIL SU06-2	1.0	9.9	90.8	8.4	125	25.00	8.92	457
25	2	4MEZ CEIL SU06-3	1.0	15.4	65.9	29.9	46.8	33.53	34.77	434
25	2	5MEZ CEIL SU06-4	1.0	8.6	101	0.7	1360	24.89	0.00	447
25	2	6MEZ CEIL SU06-5	1.0	19.8	53.4	105.5	21.2	13.56	127.93	433
25	2	7MEZ CEIL SU06-6	1.0	5.1	154	21.2	59.9	6.17	25.52	467
25	2	8MEZ CEIL SU06-7	1.0	4.7	166	0.0	0.0	13.31	0.00	448
25	2	9MEZ CEIL SU06-8	1.0	2.7	269	5.6	177	5.39	6.57	467
25	2	10MEZ CEIL SU06-9	1.0	6.0	106	6.5	161	20.34	6.54	464
25	2	11MEZ CEIL SU06-10	1.0	8.8	99.2	15.5	75.9	19.25	17.87	457
25	2	12MEZ CEIL SU06-11	1.0	8.1	106	7.2	142	20.03	7.73	466
25	2	13MEZ CEIL SU06-12	1.0	7.7	110	0.0	0.0	22.05	0.00	456
25	2	14MEZ CEIL SU06-13	1.0	1.4	476	9.9	109	0.25	12.01	466
25	2	15MEZ CEIL SU06-14	1.0	9.1	96.7	13.2	86.1	20.58	14.98	467
25	2	16MEZ CEIL SU06-15	1.0	1.9	372	7.4	139	2.46	8.93	457
25	2	17MEZ CEIL SU06-16	1.0	20.8	53.5	37.5	30.5	37.54	68.10	457
25	2	18MEZ CEIL SU06-17	1.0	10.7	85.6	20.6	61.2	22.45	23.92	460
25	2	19MEZ CEIL SU06-18	1.0	13.9	70.6	15.4	76.4	33.78	16.91	460
25	2	20MEZ CEIL SU06-19	1.0	9.7	92.2	6.6	153	25.11	6.71	458
25	2	21MEZ CEIL SU06-20	1.0	5.8	138	11.1	98.8	12.38	12.92	458
25	2	22MEZ CEIL SU06-21	1.0	8.7	99.6	21.6	59.2	16.79	25.39	451
25	2	23MEZ CEIL SU06-22	1.0	4.7	165	0.0	0.0	13.19	0.00	466
25	2	24MEZ CEIL SU06-23	1.0	9.8	91.4	14.5	80.0	22.53	16.47	454
25	2	25MEZ CEIL SU06-24	1.0	6.7	123	3.6	264	17.82	3.44	456
25	2	26MEZ CEIL SU06-25	1.0	6.7	123	3.6	264	17.46	3.46	468
25	2	27MEZ CEIL SU06-26	1.0	6.8	122	13.3	84.4	14.19	15.76	457
25	2	28MEZ CEIL SU06-27	1.0	1.7	410	3.6	264	3.37	4.22	467
25	2	29MEZ CEIL SU06-28	1.0	1.7	415	0.0	0.0	4.67	0.00	471
25	2	30MEZ CEIL SU06-29	1.0	1.9	373	3.4	277	4.01	3.97	457
25	2	31MEZ CEIL SU06-30	1.0	4.0	191	5.3	185	9.19	6.02	461

DPM DPM2

4.3.7 SU007-Out Building

This was a Class 3 survey unit.

Summary results are provided in Table 4-8 which is followed by the survey package, a survey map, survey data sheets, charts presenting the survey data, instrument download reports and the smear results from the Packard Tri-Carb Liquid Scintillation counter.

Table 4-8: SU007 Summary Results

Summary Survey Unit 007 Out Building, Class 3	Beta	Beta Scan Maximums* (dpm/100cm ²)	H-3 Smear (dpm/100cm ²)	C-14 Smear (dpm/100cm ²)
	Fixed Reading (dpm/100cm ²)			
Number	34	2	34	34
Average	1,548	5,173	8.5	5.9
Standard Deviation	940	N/A	12.3	10.0
Maximum	4,658	5,687	61.5	49.4

*Beta scan maximum results include maximum data from fixed readings.



FSS Survey Package Worksheet for
EaglePicher SU007

Package Identification No.: SU07F/SU07S	Prepared by: Paul C. Ely
Location: Out Buildings	Date Prepared: 9/30/2009
Area Classification: Class 3	Signature: <i>Paul Ely</i>

Area Description

The survey area includes the floors, walls and ceilings. There are two Out Buildings, the former Solvent Storage Building and the former Mixed Waste Storage Shed.

Historical Information

Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3. Both the former Solvent Storage Building and the former Mixed Waste Storage Shed are empty and do not contain residual hazardous material.

General Survey Instructions

- Use gas proportional detector model numbers 43-68, or equivalent detector as approved by the ES PM for beta surface activity surveys. The total instrument efficiency should use the following factors:
 - ϵ_i , 2π instrument efficiency from calibration papers. If a 4π efficiency is reported, calculate the 2π efficiency as follows using a 5% beta Back Scatter factor (BS). $\epsilon_i = (2 * \epsilon_{4\pi}) \backslash (1 + BS)$
 - ϵ_s , the beta surface efficiency is 25%.
 - ϵ_t , the total beta efficiency = $\epsilon_i * \epsilon_s$
- Perform surface scans at a scan speed of 1 probe width per second or less for the 43-68. Any locations that exceed 2,500 cpm beta above background should be marked with a felt tip pen or equivalent and the extent of the elevated area recorded.
 - 25% scan of floor and lower walls (6-feet and below), for beta contamination and 10% scan of upper walls and ceiling for beta contamination.
- Perform direct beta surface activity measurements at each measurement location. All surveys locations are referenced from the southwest corner of the survey unit. Random survey locations were generated for this class 3 survey unit.
- Collect a removable surface activity sample (smear) over an area of 100 cm² in size at each measurement location provided on survey maps and place the smear in a liquid scintillation vial immediately after it was taken.

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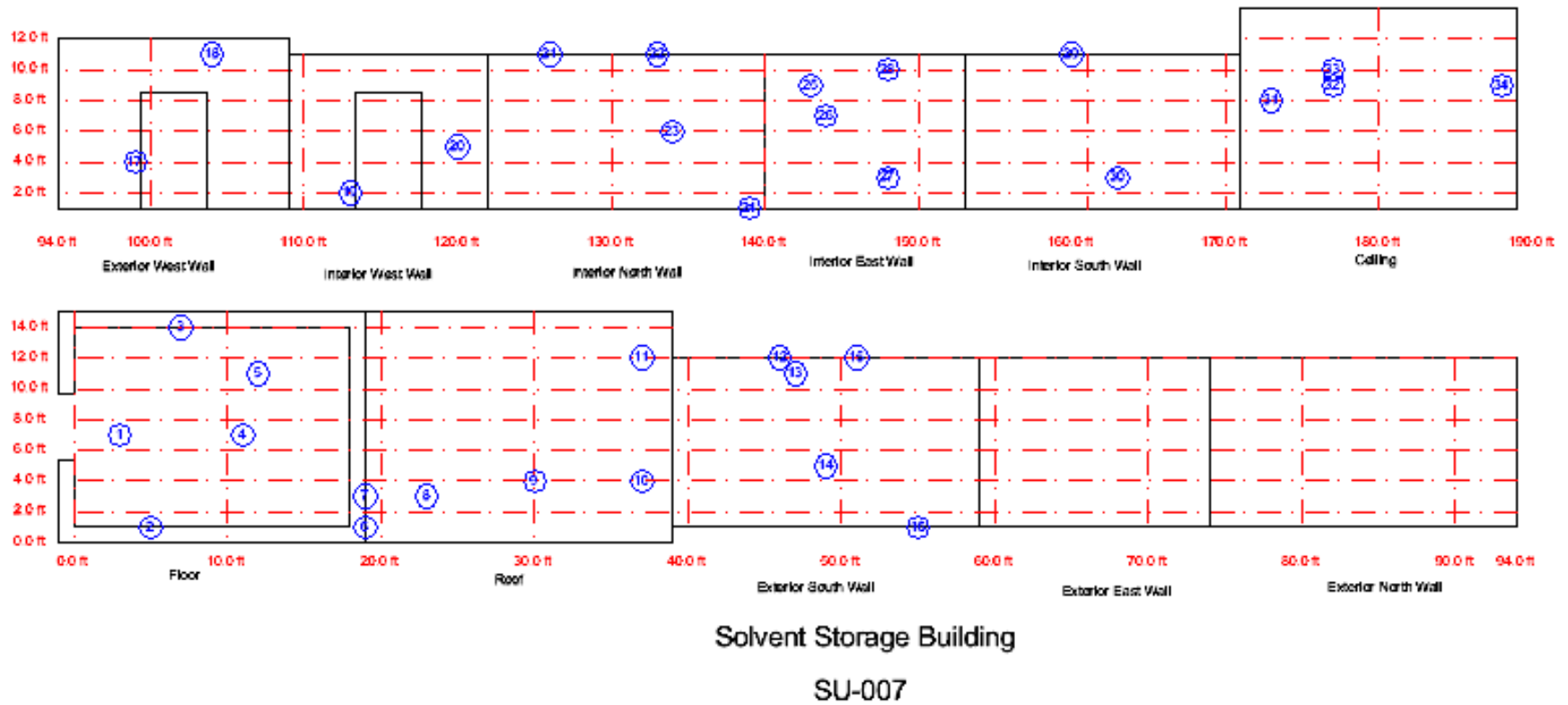


Figure 4-8 SU007 Survey Map

**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

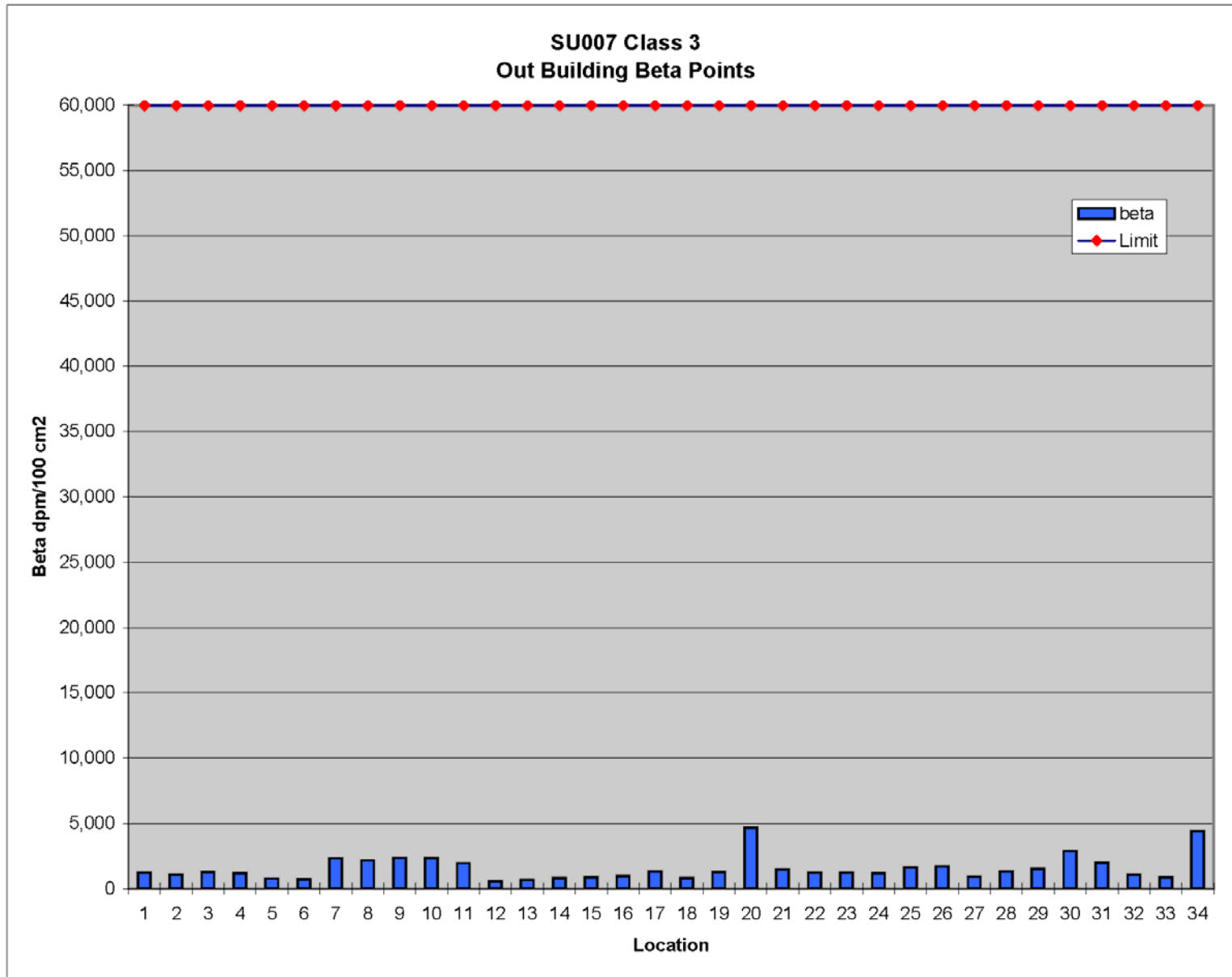
**CS-HP-PN-018
Revision 1**

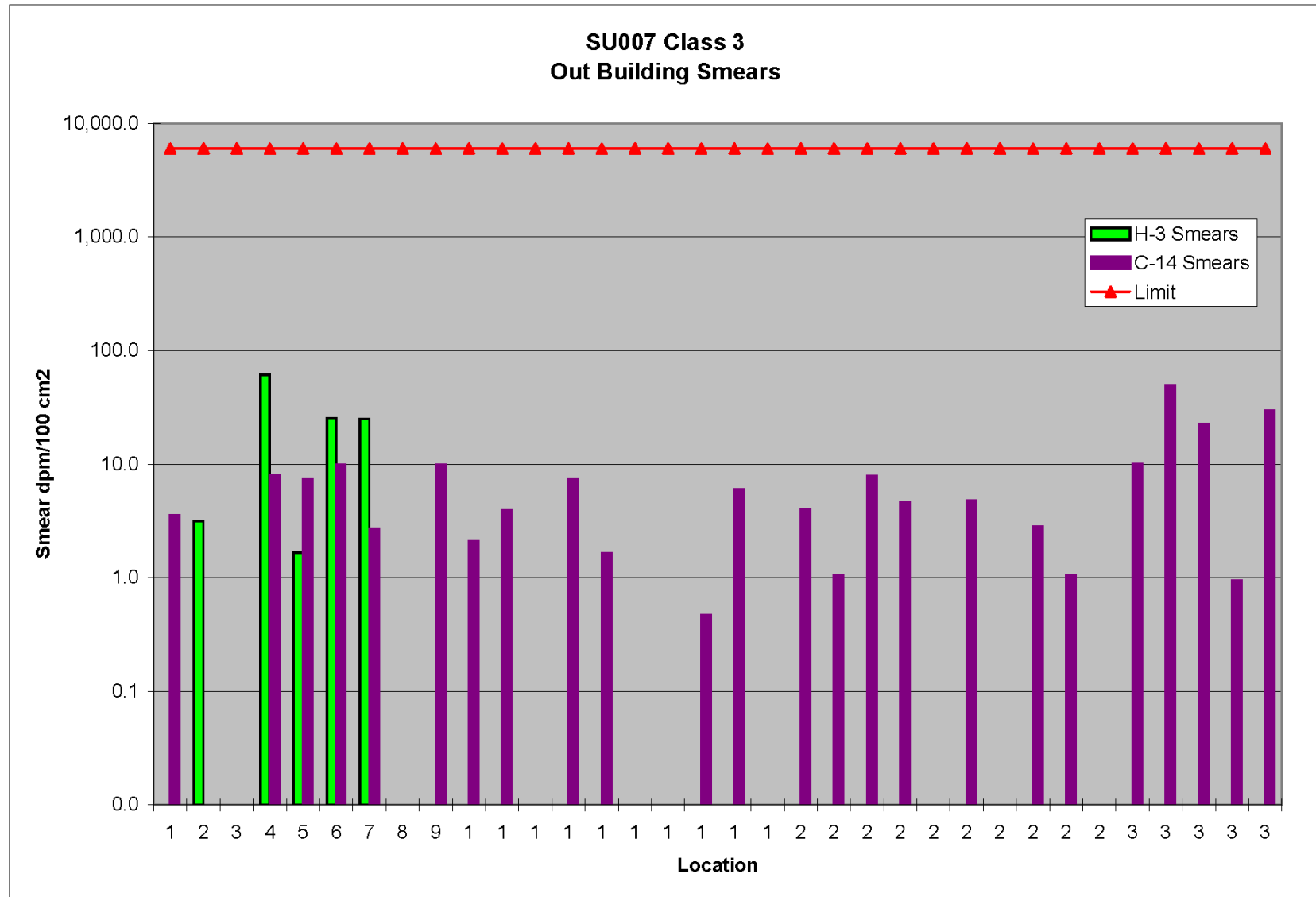
EaglePicher FSS Data Sheet
Survey Unit 007
Out Building

Detector Type	Detector SN	Detector (cm ²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 43-68 (beta)	91028	126	9/28/10	2350-1	117566	9/28/10
Packard Tri-Carb B2555	401663	NA	Daily	NA	NA	NA

Survey Point	Loc.*		Beta		H-3		C-14
			Fixed Reading (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)
1	F	Floor	1,220	60,000	0.0	6,000	3.6
2	F	Floor	1,072	60,000	0.0	6,000	0.0
3	F	Floor	1,263	60,000	13.5	6,000	0.0
4	F	Floor	1,107	60,000	0.0	6,000	8.0
5	F	Floor	785	60,000	0.0	6,000	7.3
6	R	Roof	711	60,000	0.0	6,000	9.9
7	R	Roof	2,313	60,000	14.5	6,000	2.7
8	R	Roof	2,165	60,000	0.1	6,000	0.0
9	R	Roof	2,355	60,000	0.0	6,000	9.9
10	R	Roof	2,324	60,000	21.4	6,000	2.1
11	R	Roof	1,952	60,000	6.0	6,000	3.9
12	W	Wall	573	60,000	6.1	6,000	0.0
13	W	Wall	668	60,000	5.4	6,000	7.3
14	W	Wall	806	60,000	11.4	6,000	1.7
15	W	Wall	881	60,000	0.0	6,000	0.0
16	W	Wall	966	60,000	0.0	6,000	0.0
17	W	Wall	1,337	60,000	19.3	6,000	0.5
18	W	Wall	828	60,000	0.0	6,000	6.0
19	W	Wall	1,263	60,000	10.4	6,000	0.0
20	W	Wall	4,658	60,000	13.6	6,000	4.0
21	W	Wall	1,464	60,000	0.0	6,000	1.1
22	W	Wall	1,210	60,000	9.4	6,000	7.9
23	W	Wall	1,231	60,000	1.6	6,000	4.6
24	W	Wall	1,167	60,000	13.3	6,000	0.0
25	W	Wall	1,623	60,000	0.0	6,000	4.8
26	W	Wall	1,708	60,000	10.7	6,000	0.0
27	W	Wall	902	60,000	13.9	6,000	2.8
28	W	Wall	1,326	60,000	0.0	6,000	1.1
29	W	Wall	1,528	60,000	3.2	6,000	0.0
30	W	Wall	2,865	60,000	0.0	6,000	10.0
31	C	Ceiling	1,963	60,000	61.5	6,000	49.4
32	C	Ceiling	1,061	60,000	1.7	6,000	22.5
33	C	Ceiling	881	60,000	25.5	6,000	0.9
34	C	Ceiling	4,393	60,000	25.1	6,000	29.7
Average			1,548		8.5		5.9
Standard Deviation			940		12.3		10.0
Maximum			4,658		61.5		49.4

* R = Roof, F = Floor, W = Wall, C = Ceiling, E = Equipment







M2350-1 Download BETA Report

File Name : 00000049		Survey Description : SU7SF Points 1-34	
Survey Reason : Final Status			
User ID : RLS2098		Technician Name : Lee Severtson	
Instrument Model : 2350-1	Instrument S/N : 117566	Instrument Cal. Due : 9/28/2010	
Detector Model : 43-68b	Detector S/N : 091028	Detector Cal. Due : 9/28/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm ² Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0748	Survey Date : 11/5/2009	
Minimum Net DPM Observed : -1532	Mean Net DPM : 3227		
Maximum Net DPM Observed : 41423	STDEV Observed : 8709	# of Samples Taken : 40	

Lee Severtson
Print Name
Signature
Date 11-5-09

Richard P. Stoney
Print Name
Signature
Date 11-05-09

Comments:

No scan readings found > 1000 cpm. This is equivalent to 5.687 dpm/100cm². $1000 \text{ cpm} - 464 \text{ cpm (background)} = 536 \text{ cpm}$. $536 \text{ cpm} \div 0.0748 \text{ cpm/dpm (Efficiency)} \div 126 \text{ cm}^2 \times 100 \text{ cm}^2 = 5.687 \text{ dpm/100 cm}^2$. PEE

Sign-Off

Paul Ely
Print Name

Paul Ely
Signature

12/9/09
Date

Page 1 of 3

Duratek Beta Survey Report

Download File Name: 00000049

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU7SF	S0001	0	3,196.0	600	PRBBK	B9999	ZZZZZ	0	464	-1,532
SU7SF	S0001	1	4,166.0	60	PRSC1	B9999	ZZZZZ	0	464	39,279
SU7SF	S0001	2	579.0	60	FLDCT	B9999	ZZZZZ	1	464	1,220
SU7SF	S0001	3	565.0	60	FLDCT	B9999	ZZZZZ	2	464	1,072
SU7SF	S0001	4	583.0	60	FLDCT	B9999	ZZZZZ	3	464	1,263
SU7SF	S0001	5	574.0	60	FLDCT	B9999	ZZZZZ	4	464	1,167
SU7SF	S0001	6	538.0	60	FLDBK	B9999	ZZZZZ	5	464	785
SU7SF	S0001	7	531.0	60	FLDCT	B9999	ZZZZZ	6	464	711
SU7SF	S0001	8	583.0	60	FLDCT	B9999	ZZZZZ	19	464	1,263
SU7SF	S0001	9	903.0	60	FLDCT	B9999	ZZZZZ	20	464	4,658
SU7SF	S0001	10	602.0	60	FLDCT	B9999	ZZZZZ	21	464	1,464
SU7SF	S0001	11	578.0	60	FLDCT	B9999	ZZZZZ	22	464	1,210
SU7SF	S0001	12	580.0	60	FLDCT	B9999	ZZZZZ	23	464	1,231
SU7SF	S0001	13	574.0	60	FLDCT	B9999	ZZZZZ	24	464	1,167
SU7SF	S0001	14	617.0	60	FLDCT	B9999	ZZZZZ	25	464	1,623
SU7SF	S0001	15	625.0	60	FLDCT	B9999	ZZZZZ	26	464	1,708
SU7SF	S0001	16	549.0	60	FLDCT	B9999	ZZZZZ	27	464	602
SU7SF	S0001	17	589.0	60	FLDCT	B9999	ZZZZZ	28	464	1,326
SU7SF	S0001	18	608.0	60	FLDCT	B9999	ZZZZZ	29	464	1,528
SU7SF	S0001	19	734.0	60	FLDCT	B9999	ZZZZZ	30	464	2,885
SU7SF	S0001	20	399.0	60	FLDBK	B9999	ZZZZZ	30	464	-690
SU7SF	S0001	21	649.0	60	FLDCT	B9999	ZZZZZ	31	464	1,963
SU7SF	S0001	22	564.0	60	FLDCT	B9999	ZZZZZ	32	464	1,081
SU7SF	S0001	23	547.0	60	FLDCT	B9999	ZZZZZ	33	464	881
SU7SF	S0001	24	678.0	60	FLDCT	B9999	ZZZZZ	34	464	4,393
SU7SF	S0001	25	590.0	60	FLDCT	B9999	ZZZZZ	17	464	1,337
SU7SF	S0001	26	542.0	60	FLDCT	B9999	ZZZZZ	18	464	828
SU7SF	S0001	27	518.0	60	FLDCT	B9999	ZZZZZ	12	464	573
SU7SF	S0001	28	527.0	60	FLDCT	B9999	ZZZZZ	13	464	668
SU7SF	S0001	29	540.0	60	FLDCT	B9999	ZZZZZ	14	464	808
SU7SF	S0001	30	547.0	60	FLDCT	B9999	ZZZZZ	15	464	881
SU7SF	S0001	31	555.0	60	FLDCT	B9999	ZZZZZ	16	464	966
SU7SF	S0001	32	682.0	60	FLDCT	B9999	ZZZZZ	7	464	2,313
SU7SF	S0001	33	668.0	60	FLDCT	B9999	ZZZZZ	8	464	2,185
SU7SF	S0001	34	686.0	60	FLDCT	B9999	ZZZZZ	9	464	2,355
SU7SF	S0001	35	683.0	60	FLDCT	B9999	ZZZZZ	10	464	2,324
SU7SF	S0001	36	648.0	60	FLDCT	B9999	ZZZZZ	11	464	1,952
SU7SF	S0001	37	408.0	60	FLDBK	B9999	ZZZZZ	11	464	-615
SU7SF	S0001	38	3,323.0	600	PTBBK	B9999	ZZZZZ	1	464	-1,397

Beta Flag

45000 -

Beta Max Flag

60000

Thursday, November 05, 2009

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Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU7SF	S0001	39	4,368.0	60	PTSC1	B9999	ZZZZZ	1	464	41,423

Beta Flag	45000	-
Beta Max Flag	60000	

Thursday, November 05, 2009

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**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

04 Nov 2009 17:31 ALPHA/BETA - 1.09 Page #1
Protocol #: 2 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Background Subtract: 1st Vial Low Energy: 3H
High Energy: 14C

	LL	UL	LCR	2S%	BKG
Region A:	0.0 - 12.0	0	0.0	9.95	
Region B:	12.0 - 156	0	0.0	15.15	
Region C:	0.0 - 0.0	0	0.0	0.00	

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA2.003

P#PID S#	SMPL_ID	TIME	CPMAA:2S%	CPMBB:2S%	3H-DPM	14C-DPM	tSIE	FLAG
2 1 1		10.0	10.0 20.0	15.1 16.3	0.00	0.00	399	B
2 1 2	SU007-1	1.0	0.0 ****	2.9 31.0	0.00	3.57	385	
2 1 3	SU007-2	1.0	0.0 0.0	0.0 0.0	0.00	0.00	384	
2 1 4	SU007-3	1.0	4.0 191	0.0 0.0	13.49	0.00	382	
2 1 5	SU007-4	1.0	0.0 0.0	6.4 151	0.00	8.01	379	
2 1 6	SU007-5	1.0	0.0 0.0	5.8 163	0.00	7.33	359	
2 1 7	SU007-6	1.0	0.0 ****	7.9 126	0.00	9.85	379	
2 1 8	SU007-7	1.0	5.0 158	2.9 310	14.48	2.72	412	
2 1 9	SU007-8	1.0	0.0 ****	0.0 0.0	0.14	0.00	417	
2 1 10	SU007-9	1.0	0.0 0.0	7.9 126	0.00	9.91	360	
2 1 11	SU007-10	1.0	7.2 118	2.7 331	21.39	2.10	412	
2 1 12	SU007-11	1.0	2.4 301	3.5 259	5.98	3.92	420	
2 9 13	SU007-12	1.0	2.0 352	0.0 0.0	6.11	0.00	429	
2 9 14	SU007-13	1.0	2.7 278	6.2 153	5.40	7.34	431	
2 9 15	SU007-14	1.0	4.0 191	1.9 465	11.42	1.65	425	
2 9 16	SU007-15	1.0	0.0 0.0	0.0 0.0	0.00	0.00	427	
2 9 17	SU007-16	1.0	0.0 0.0	0.0 0.0	0.00	0.00	421	
2 9 18	SU007-17	1.0	6.7 126	1.2 680	19.33	0.47	430	
2 9 19	SU007-18	1.0	0.0 ****	4.9 191	0.00	6.04	425	
2 9 20	SU007-19	1.0	3.4 223	0.0 0.0	10.39	0.00	419	
2 9 21	SU007-20	1.0	5.0 158	3.9 235	13.57	3.98	427	
2 9 22	SU007-21	1.0	0.0 0.0	0.9 981	0.00	1.06	428	
2 9 23	SU007-22	1.0	4.0 191	6.9 142	9.42	7.87	424	
2 9 24	SU007-23	1.0	1.0 662	3.9 235	1.57	4.63	428	
2 10 25	SU007-24	1.0	4.0 191	0.0 0.0	13.34	0.00	387	
2 10 26	SU007-25	1.0	0.0 0.0	3.9 235	0.00	4.80	423	
2 10 27	SU007-26	1.0	3.5 215	0.0 0.0	10.67	0.00	425	
2 10 28	SU007-27	1.0	5.0 160	2.9 303	13.85	2.82	424	
2 10 29	SU007-28	1.0	0.0 0.0	0.9 981	0.00	1.06	407	
2 10 30	SU007-29	1.0	1.0 662	0.0 0.0	3.17	0.00	422	
2 10 31	SU007-30	1.0	0.0 0.0	8.0 124	0.00	10.01	421	
2 10 32	SU007-31	1.0	24.1 49.1	42.8 36.1	61.45	49.44	382	
2 10 33	SU007-32	1.0	3.0 246	18.5 64.2	1.66	22.52	422	
2 10 34	SU007-33	1.0	8.0 108	1.9 464	25.49	0.94	390	
2 10 35	SU007-34	1.0	11.5 82.2	25.4 51.1	25.05	29.73	414	

4.3.8 SU008-Paved Areas

This was a Class 3 survey unit.

Summary results are provided in Table 4-9 which is followed by the survey package, a survey map, a survey data sheet, a chart presenting the survey data, and the Survey Form.

Table 4-9: SU008 Summary Results

Summary Survey Unit 008 Paved Areas, Class 3	Gamma (μR/hr)
Number	16
Average	7.3
Standard Deviation	0.6
Maximum	8.5



FSS Survey Package Worksheet for
EaglePicher SU008

Package Identification No.: SU08F/SU08S	Prepared by: Paul C. Ely
Location: Site Paved Areas & Sidewalks	Date Prepared: 12/22/2009
Area Classification: Class 3	Signature: <i>Paul Ely</i>

Area Description

The survey area includes the site paved areas and sidewalks.

Historical Information

Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3.

General Survey Instructions

1. Use a 2" by 2" NaI detector, Ludlum model number 44-10, or equivalent as approved by the ES PM for exposure rate surveys. Obtain surface scan exposure rate data, at about 6-in above the soil surface, over 100% of the soil where buildings were removed and 10% for the rest of the site. The detector should be moved back and forth in a serpentine motion, while walking over the surface at a speed not to exceed approximately 0.25 meters per second. Scans will be logged but the logged data is for information only. Identify any elevated areas of measurement and record the maximum reading obtained.
2. Obtain and record a dose rate measurement at each location indicated on the attached survey map at about 6-in above the soil surface.

Survey Package Worksheet SU08F/SU08S (cont'd)

Special Instructions	
<ul style="list-style-type: none"> Source check instrumentation to Cs-137 for gamma measurements. Record measurement results in cpm on a Radiation Protection Survey Form. 	<ul style="list-style-type: none"> The attached map provides measurement and sampling locations.

Survey Performance (Initial and date as each item is completed)															
Location Codes			General Description	Beta Scan	Survey Tech	Direct Beta	Survey Tech	Direct Alpha	Survey Tech	Alpha Scan	Survey Tech	Direct Gamma	Survey Tech	Smear Gross (Liq. Scint.)	Survey Tech
L1	L2	L6													
EaglePicher SU008 Class 3 Area															
Package ID	Surface or Structure	Material Code			Initial & Date	@60 sec	Initial & Date	@60 sec	Initial & Date		Initial & Date	@100 cm	Initial & Date	β	Initial & Date
SU08F	A0001	B9999	Paved Area	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16	N/A	N/A	N/A
Survey Comments															
* See Attached Survey Form, Log# EP-09-290 PEE 12/22/09															
Package Review															
Surveyor(s) Signatures: * See Attached Survey Form, Log# EP-09-290 PEE 12/22/09															
Date Package Completed: 12/15/09															
Package Review by and Date (Signature): Paul C. Ely 12/22/09															

Rev. 0

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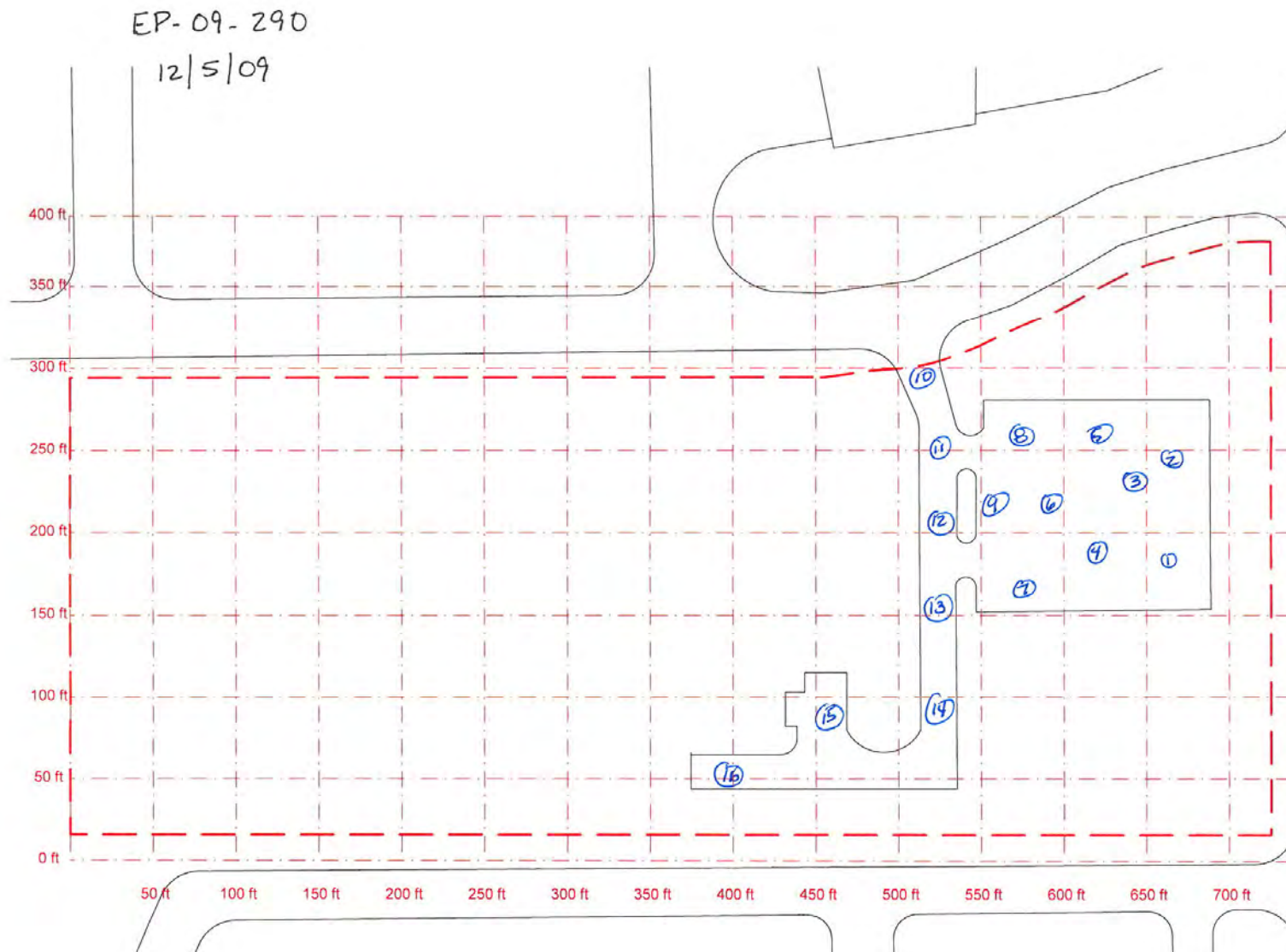


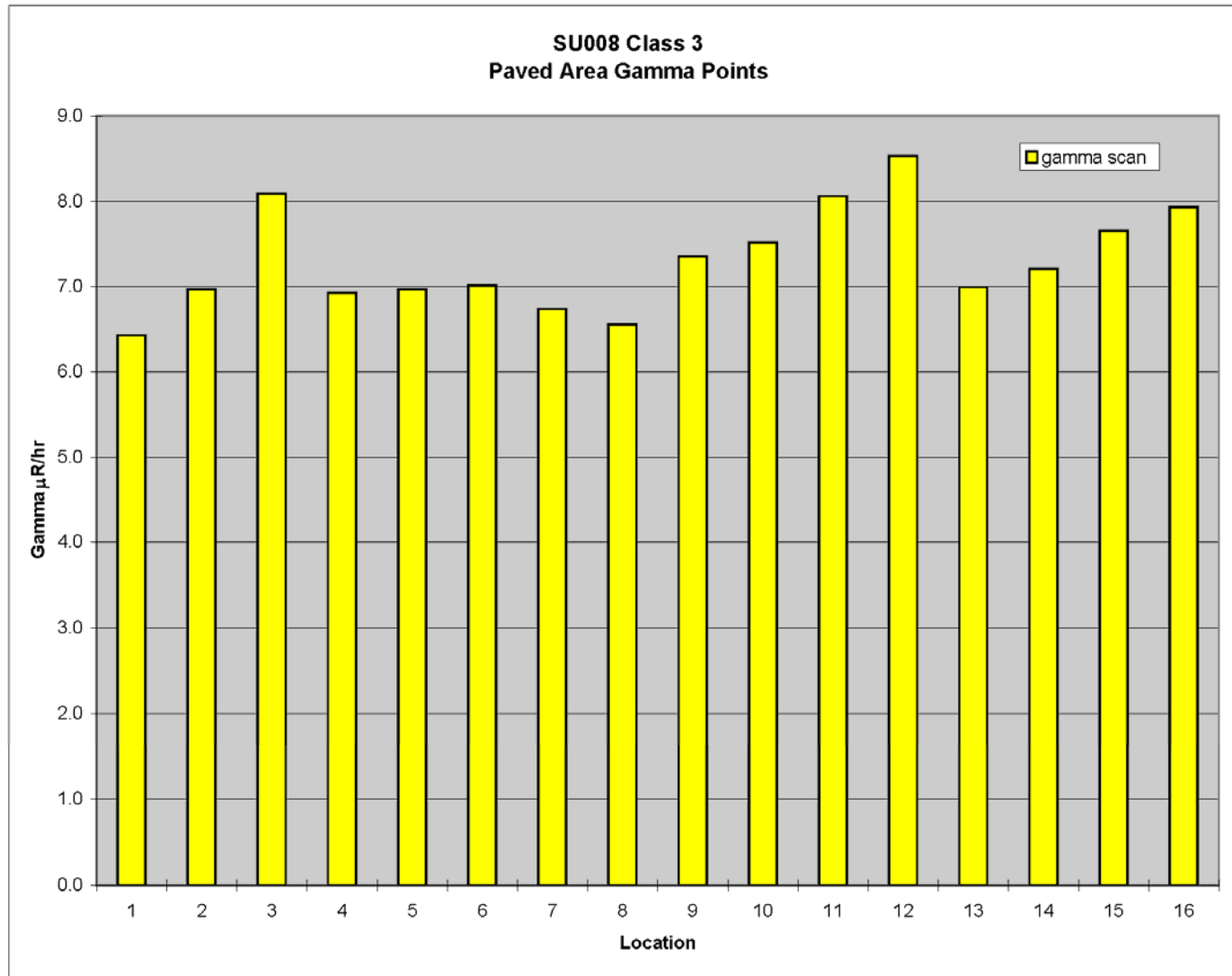
Figure 4-9 SU008 Survey Map

EaglePicher FSS Data Sheet
Survey Unit 008
Pavement

Detector Type	Detector SN	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 44-10 (gamma)	192598	12/4/09	2350-1	126183	12/4/09

Gamma Scan		
Survey Point	cpm	(μ R/hr)
1	6,050	6.4
2	6,560	7.0
3	7,620	8.1
4	6,520	6.9
5	6,560	7.0
6	6,600	7.0
7	6,340	6.7
8	6,170	6.6
9	6,920	7.4
10	7,070	7.5
11	7,590	8.1
12	8,030	8.5
13	6,580	7.0
14	6,780	7.2
15	7,210	7.7
16	7,470	7.9
Average	6,879	7.3
Standard Deviation	570	0.6
Maximum	8,030	8.5

Calibration
Constant
(Counts/R)
5.649E+10



Survey Log #: EP-09-290

Page 1 of 2

4.3.9 SU009-Soil Areas

This was a Class 3 survey unit.

Summary results are provided in Table 4-10 which is followed by the survey package, a survey map, survey data sheets, charts presenting the survey data, instrument download reports and the laboratory analytical results. The laboratory analytical reports are provided in Attachment 7.6.

Table 4-10: SU009 Summary Results

Summary Survey Unit 009 Soil Areas, Class 3	Gamma Points (μR/hr)	H-3 in Soil (pCi/g)	C-14 in Soil (pCi/g)
Number	31	34	34
Average	10.5	1.39	2.63
Standard Deviation	0.7	3.74	2.94
Maximum	11.9	15.10	13.60



FSS Survey Package Worksheet for
EaglePicher SU009

Package Identification No.: SU009	Prepared by: Paul C. Ely
Location: Site Soil Areas	Date Prepared: 9/30/2009
Area Classification: Class 3	Signature: <i>Paul Ely</i>

Area Description

The survey area includes the site soil areas including areas where structures have been removed.

Historical Information

Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3.

General Survey Instructions

1. Perform soil surveys and sampling according to procedure CS-FO-PR-003 and this instruction.
2. Use a 2" by 2" NaI detector, Ludlum model number 44-10, or equivalent as approved by the ES PM for exposure rate soil surveys. Obtain surface scan exposure rate data, at about 6-in above the soil surface, over 100% of the soil where buildings were removed and 10% for the rest of the site. The detector should be moved back and forth in a serpentine motion, while walking over the surface at a speed not to exceed approximately 0.25 meters per second. Scans will be logged but the logged data is for information only. Identify any elevated areas of measurement and record the maximum reading obtained.
3. Sample locations are indicated on the attached figure. Using a tape measure locate each sample to be taken and mark the location with a surveyors wire flag and mark the sample location number on the flag.
4. Obtain and record a dose rate measurement at each sample location at about 6-in above the soil surface.
5. Using hand tools, obtain a ~ 1,000 ml surface sample (~0 to 6-in deep) from the sample location. Place the sample into a gallon size large Ziploc® type bag and label the container with the sample information. Record the sample information on Field Sample Data Sheets (attached).
6. Every 10th sample will have twice as much material collected split in half. Both halves will be sent offsite for analysis. A Chain-Of-Custody form (attached) will be completed for each sample sent offsite.
7. After each use, thoroughly clean all parts of the soil sampling tool. Cleaning is accomplished with a nylon brush, clean water and phosphate-free soap. Then rinse with clean water.

Special Instructions

- | | |
|---|---|
| <ul style="list-style-type: none"> • Source check instrumentation to Cs-137 for gamma measurements. • Record maximum scan measurement results, in cpm, for each scan area. • Random measurement and sampling locations were generated for this Class 3 survey package. | <ul style="list-style-type: none"> • The attached map provides measurement and sampling locations. • Notify the ES Project Manager of locations that exceed measured activity 50% greater than the average activity. • Attach photographic records if available and provide descriptive comments for each image under Survey Comments. |
|---|---|

Survey Performance (Initial and date as each item is completed)

[illegible]

Page 3 of 3

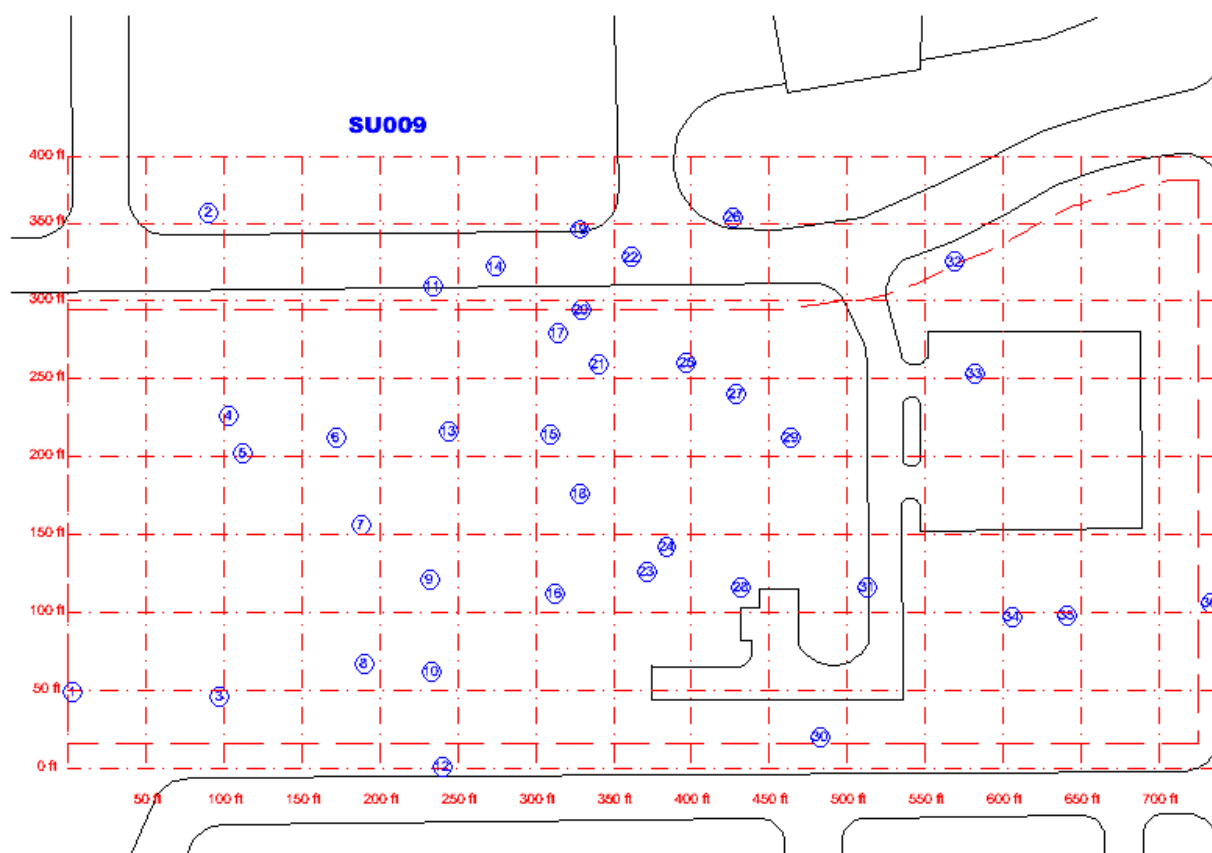


Figure 4-10 SU009 Survey Map

Samples not taken at locations 14, 22 and 33 as these locations were in the road or in the parking lot.

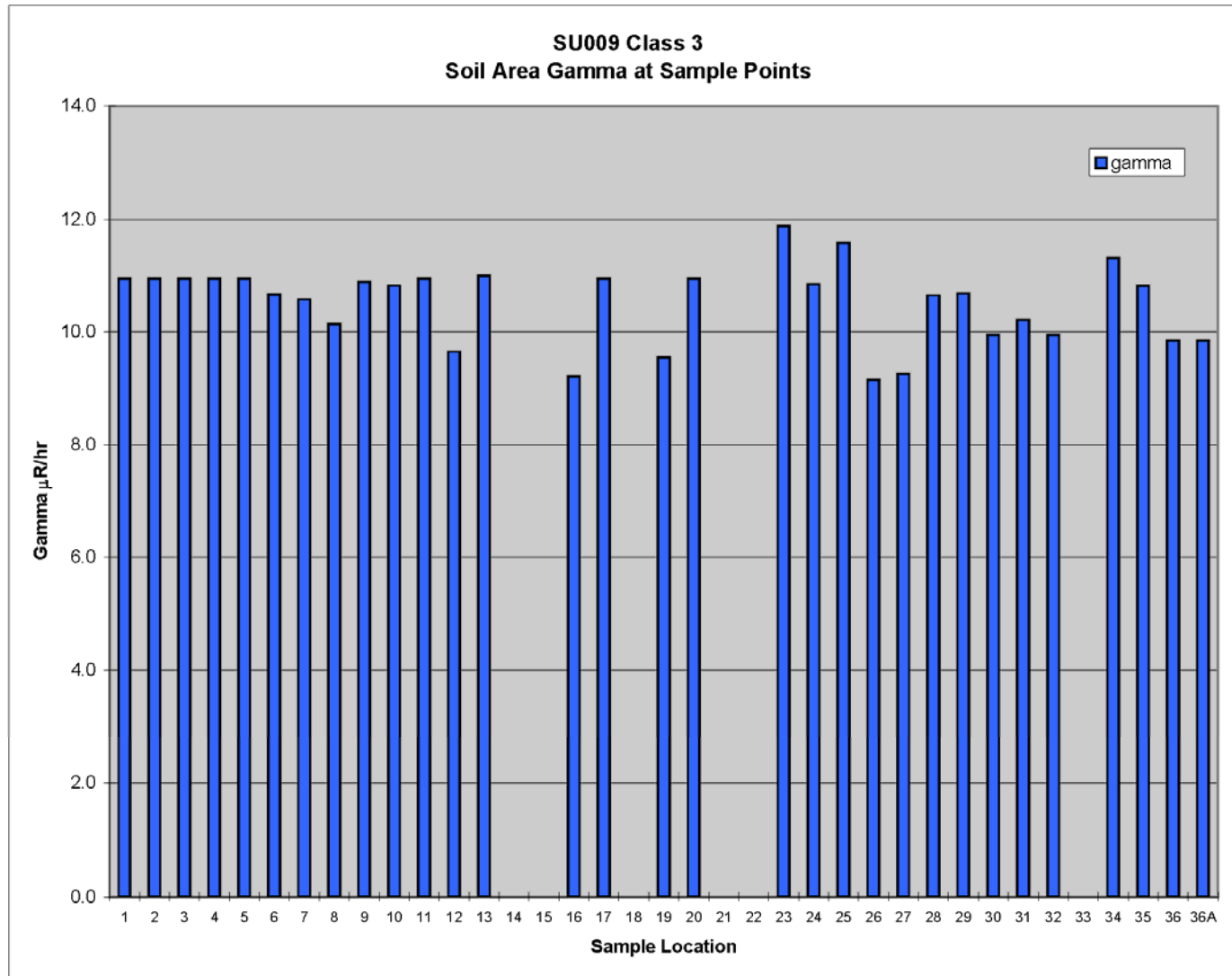
**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

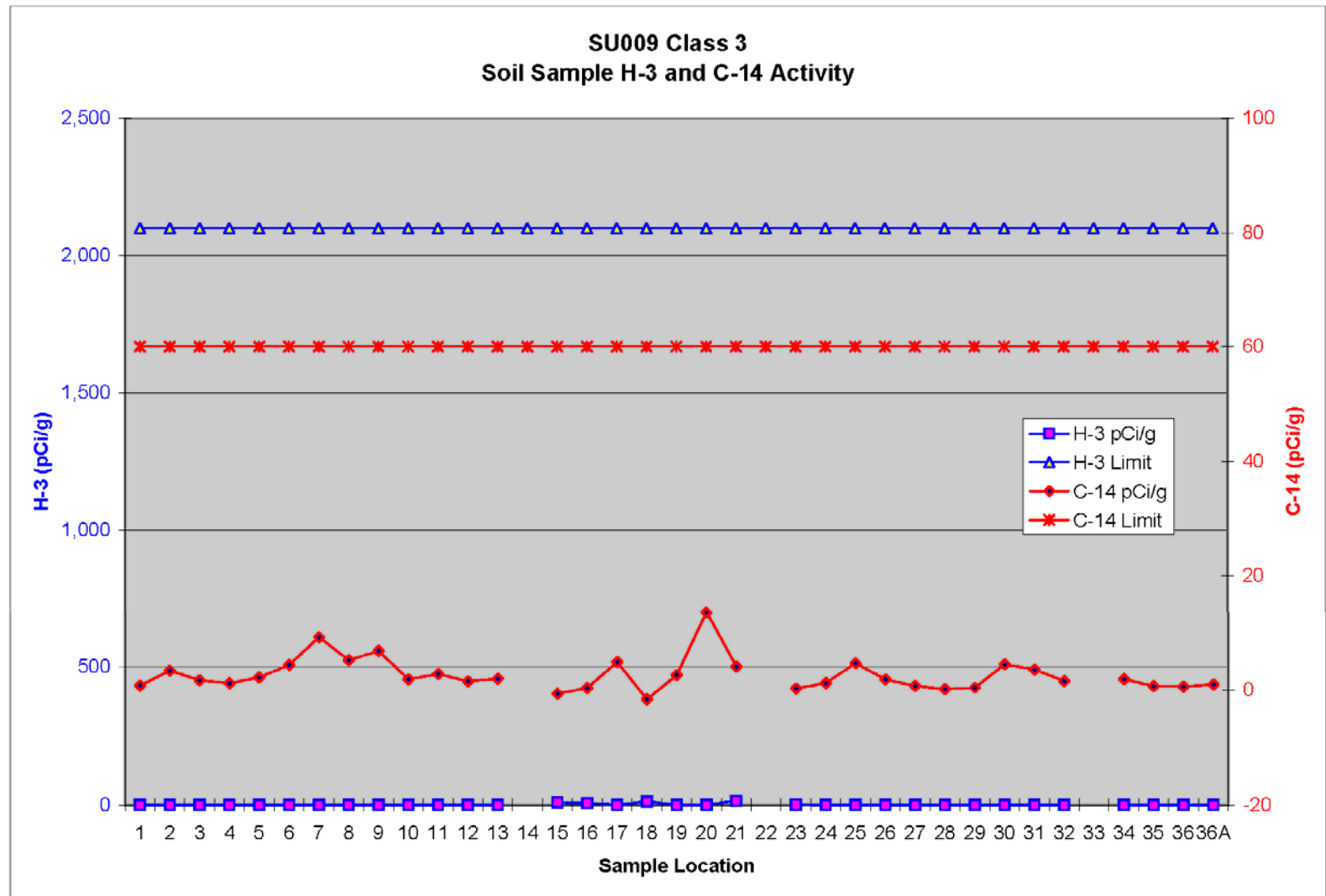
**CS-HP-PN-018
Revision 1**

EaglePicher FSS Data Sheet
Survey Unit 009
Soil Areas

Detector Type	Detector SN	Detector (cm ²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due	Calibration Constant (Counts/R)
Ludlum 44-10 (gamma)	157372	2x2 Nai	4/21/10	2350-1	117573	4/18/10	5.904E+10
Ludlum 44-10 (gamma)	227358	2x2 Nai	5/18/10	2350-1	117555	4/21/10	6.033E+10

Survey Point	Loc.*	Gamma	Gamma	H-3		C-14	
		Fixed Reading (cpm)	Fixed Reading (µR/hr)	Sample (pCi/g)	Limit (pCi/g)	Sample (pCi/g)	Limit (pCi/g)
1	Soil	11,000	10.9	0.230	2,100	0.770	60
2	Soil	11,000	10.9	-0.030	2,100	3.360	60
3	Soil	11,000	10.9	0.030	2,100	1.700	60
4	Soil	11,000	10.9	0.110	2,100	1.180	60
5	Soil	11,000	10.9	0.150	2,100	2.200	60
6	Soil	10,490	10.7	0.040	2,100	4.370	60
7	Soil	10,399	10.6	-0.001	2,100	9.200	60
8	Soil	9,973	10.1	-0.210	2,100	5.200	60
9	Soil	10,702	10.9	-0.130	2,100	6.800	60
10	Soil	10,641	10.8	0.020	2,100	1.860	60
11	Soil	11,000	10.9	-0.090	2,100	2.790	60
12	Soil	9,700	9.6	-0.110	2,100	1.520	60
13	Soil	10,808	11.0	-0.050	2,100	1.990	60
14	Soil	N/A	N/A		2,100		60
15	Soil	NT	NT	9.510	2,100	-0.638	60
16	Soil	9,062	9.2	6.210	2,100	0.380	60
17	Soil	11,000	10.9	0.020	2,100	4.870	60
18	Soil	NT	NT	12.900	2,100	-1.620	60
19	Soil	9,600	9.5	-0.050	2,100	2.610	60
20	Soil	11,000	10.9	0.170	2,100	13.600	60
21	Soil	NT	NT	15.100	2,100	4.110	60
22	Soil	N/A	N/A		2,100		60
23	Soil	11,694	11.9	1.160	2,100	0.280	60
24	Soil	10,664	10.8	0.220	2,100	1.200	60
25	Soil	11,381	11.6	0.070	2,100	4.680	60
26	Soil	9,200	9.1	0.030	2,100	1.840	60
27	Soil	9,110	9.3	0.390	2,100	0.690	60
28	Soil	10,470	10.6	0.910	2,100	0.170	60
29	Soil	10,503	10.7	0.790	2,100	0.410	60
30	Soil	10,000	9.9	0.120	2,100	4.470	60
31	Soil	10,045	10.2	-0.090	2,100	3.560	60
32	Soil	10,000	9.9	-0.100	2,100	1.550	60
33	Soil	N/A	N/A		2,100		60
34	Soil	11,118	11.3	-0.060	2,100	1.900	60
35	Soil	10,639	10.8	0.060	2,100	0.670	60
36	Soil	9,900	9.8	0.007	2,100	0.620	60
36A	Soil	9,900	9.8	-0.030	2,100	0.970	60
Average	Soil	10,452	10.511	1.391		2.625	
Standard Deviation	Soil	673	0.692	3.737		2.937	
Maximum	Soil	11,694	11.884	15.100		13.600	







M2350-1 Download Gamma Report

File Name : 00000052			Survey Description : SU009 Points and Scans Soil Eagle Picher		
Survey Reason : Final Status					
User ID : RLS2098		Technician Name : Lee Severtson			
Instrument Model : 2350-1		Instrument S/N : 117555		Instrument Cal. Due : 4/21/2010	
Detector Model : 44-10		Detector S/N : 227358		Detector Cal. Due : 5/18/2010	
Measurement Type : Gamma		Detector Type : 3" x 3" NaI			
Cal. Constant :		Survey Date : 1/1/2010			
Minimum μ R/h Observed:		Mean Observed:			
Maximum μ R/h Observed:		STDEV Observed:		# of Samples Taken: 71	

Lee Severtson
Print Name

Lee Severtson
Signature

1-9-09
Date

Print Name

Signature

Date

Comments:

Sample # 0, 1 taken twice at same location
Sample # 15 taken incorrectly, not in field

Sign-Off

Paul Ely
Print Name

Paul Ely
Signature

12/9/09
Date

Page 1 of 2

Duratek Gamma Survey Report

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	<i>μR/hr: 12/8/09</i>
SU009	L0001	0	1.1E+04	60	FACT	Boq16	W14	32	10000	6.3E+11
SU009	L0001	1	1.0E+04	60				32	10000	6.3E+11
SU009	L0001	2	9.2E+03	60				26	10000	5.5E+11
SU009	L0001	3	9.6E+03	60				19	10000	5.7E+11
SU009	L0001	4	1.1E+04	60				2	10000	6.5E+11
SU009	L0001	5	1.1E+04	60				4	10000	6.6E+11
SU009	L0001	6	1.1E+04	60				5	10000	6.5E+11
SU009	L0001	7	1.1E+04	60				1	10000	6.6E+11
SU009	L0001	8	1.1E+04	60				3	10000	6.4E+11
SU009	L0001	9	9.7E+03	60				12	10000	5.8E+11
SU009	L0001	10	1.0E+04	60				30	10000	6.0E+11
SU009	L0001	11	9.9E+03	60				36	10000	5.9E+11
SU009	L0001	12	1.1E+04	60				20	10000	6.7E+11
SU009	L0001	13	1.1E+04	60				17	10000	6.5E+11
SU009	L0001	14	1.1E+04	60				11	10000	6.6E+11
SU009	L0001	15	4.7E+04	60					10000	2.8E+12

*not used
100E 12/8/09*

Gamma Flag
Gamma Max Flag

Tuesday, November 10, 2009

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M2350-1 Download Gamma Report

File Name : 00000050		Survey Description : SU009 Points and walkover	
Survey Reason : Final Status			
User ID : <i>RLS 2098</i>		Technician Name : <i>Lee Severtson</i>	
Instrument Model : 2350-1		Instrument S/N : 117573	
Detector Model : <i>44-10</i>		Instrument Cal. Due : <i>4/18/2010</i>	
Measurement Type : Gamma		Detector S/N : 157372	
Cal. Constant : 1.00E+00		Detector Cal. Due : <i>4/21/2010</i>	
Minimum μ R/h Observed: 55272000000		Detector Type : <i>2" x 2" NaI</i>	
Mean Observed: 762918750000		Survey Date : 11/9/2009	
Maximum μ R/h Observed: 28083600000		STDEV Observed: 546600459591	
		# of Samples Taken: 16	

Lee Severtson
Print Name

[Signature]
Signature

11-10-09
Date

Print Name

Signature

Date

Comments:

Gamma measurements not taken at locations 15 and 21. They were missed. PEL

Sign-Off

Paul Ely
Print Name

[Signature]
Signature

12/9/09
Date

Page 1 of 3

Duratek Gamma Survey Report

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	μ R/hr:
SU009	L0001	0	9.6E+03	60	FLD5N	80016	N/A	32	10,000	
SU009	L0001	1	9.6E+03	60						
SU009	L0001	2	9.7E+03	60						
SU009	L0001	3	9.8E+03	60						
SU009	L0001	4	9.8E+03	60						
SU009	L0001	5	9.5E+03	60						
SU009	L0001	6	9.7E+03	60				26		
SU009	L0001	7	9.6E+03	60						
SU009	L0001	8	9.7E+03	60						
SU009	L0001	9	1.0E+04	60						
SU009	L0001	10	9.3E+03	60						
SU009	L0001	11	9.6E+03	60				19		
SU009	L0001	12	9.6E+03	60						
SU009	L0001	13	9.8E+03	60						
SU009	L0001	14	9.9E+03	60						
SU009	L0001	15	9.7E+03	60						
SU009	L0001	16	1.0E+04	60				2		
SU009	L0001	17	1.0E+04	60						
SU009	L0001	18	9.8E+03	60						
SU009	L0001	19	1.0E+04	60						
SU009	L0001	20	1.0E+04	60						
SU009	L0001	21	1.0E+04	60				4		
SU009	L0001	22	1.0E+04	60						
SU009	L0001	23	1.0E+04	60						
SU009	L0001	24	1.0E+04	60						
SU009	L0001	25	1.0E+04	60						
SU009	L0001	26	1.0E+04	60				5		
SU009	L0001	27	1.0E+04	60						
SU009	L0001	28	9.9E+03	60						
SU009	L0001	29	1.0E+04	60						
SU009	L0001	30	9.9E+03	60						
SU009	L0001	31	1.0E+04	60				1		
SU009	L0001	32	1.0E+04	60						
SU009	L0001	33	1.0E+04	60						
SU009	L0001	34	1.0E+04	60						
SU009	L0001	35	1.0E+04	60						

Gamma Flag
Gamma Max Flag



Tuesday, November 10, 2009

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Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	μ R/hr:
SU009	L0001	36	1.0E+04	60	FLD 5N	30016	N1A	3	10,000	
SU009	L0001	37	1.0E+04	60						
SU009	L0001	38	1.0E+04	60						
SU009	L0001	39	9.8E+03	60						
SU009	L0001	40	1.0E+04	60						
SU009	L0001	41	9.6E+03	60						
SU009	L0001	42	9.7E+03	60						
SU009	L0001	43	9.8E+03	60						
SU009	L0001	44	9.7E+03	60						
SU009	L0001	45	9.7E+03	60						
SU009	L0001	46	9.6E+03	60						
		47	9.8E+03	60						
SU009	L0001	48	9.7E+03	60						
SU009	L0001	49	9.8E+03	60						
SU009	L0001	50	9.7E+03	60						
SU009	L0001	51	9.7E+03	60						
SU009	L0001	52	9.8E+03	60						
SU009	L0001	53	9.8E+03	60						
SU009	L0001	54	1.0E+04	60						
SU009	L0001	55	1.0E+04	60						
SU009	L0001	56	1.0E+04	60						
SU009	L0001	57	9.9E+03	60						
SU009	L0001	58	1.0E+04	60						
		59	1.0E+04	60						
SU009	L0001	60	1.0E+04	60						
SU009	L0001	61	1.0E+04	60						
SU009	L0001	62	1.0E+04	60						
SU009	L0001	63	1.0E+04	60						
SU009	L0001	64	1.0E+04	60						
SU009	L0001	65	1.0E+04	60						
SU009	L0001	66	1.0E+04	60						
SU009	L0001	67	1.0E+04	60						
SU009	L0001	68	1.1E+04	60						
SU009	L0001	69	1.1E+04	60						
SU009	L0001	70	1.0E+04	60						

Gamma Flag
Gamma Max Flag

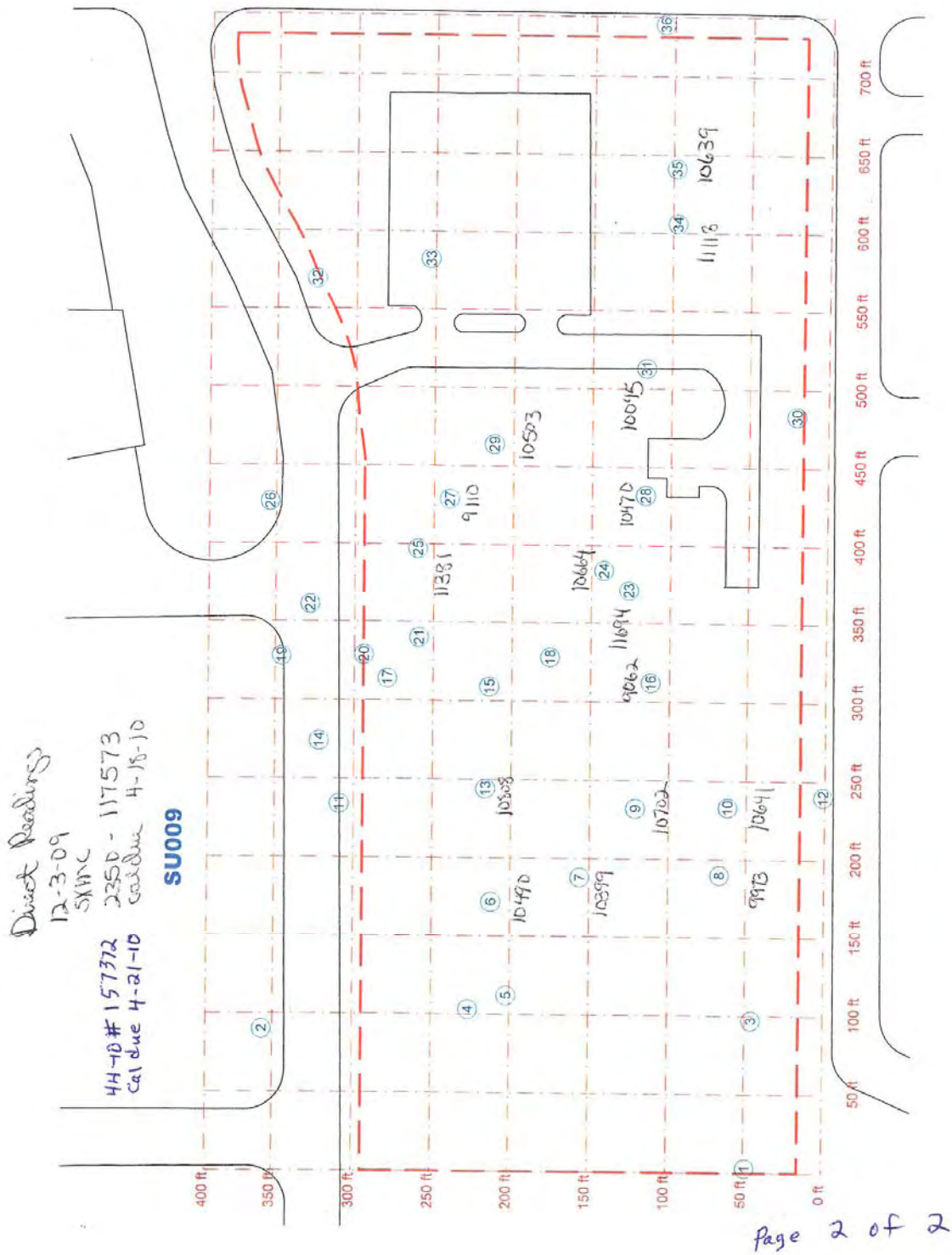


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RADIATION PROTECTION SURVEY FORM

Project ID: Eagle Picher			Survey Log #: EPO2284		
Tech (print): Shawn McChesney			Location: Eagle Picher Site		RHWP #:
Instrument(s) Used			Purpose of Survey		Date: 12-3-09
Model	S/N	Cal. Due	Soil sample field counts per FSS Survey package SUD09. See attached map for survey locations and READINGS		Time: 08:30
2350	117573	4-18-10			Sample #: N/A
44-10	157372	4-21-10			Sample #: N/A
per 12/9/09					Air Sample #: N/A
			All dose rates in uR/hr unless noted.		A/S Results (DAC):
Direct field counts performed on location 6, 7, 8, 9 10, 13, 16, 23, 24, 25, 27, 28, 29, 31, 34, 35.			Smear #	Contamination (dpm/100 cm ²)	
				alpha	beta
			1	NA	NA
			2		
			3		
			4		
			5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		
20					
COMMENTS:			LAW - Large Area Wipe * - contact/18 inch O - α/β Smear xx - RCA Boundary □ - Tritium H - Head Level Smear F - Foot level Δ - Air Sample K = 1000 # - Direct frisk		
Performed By / Date:			Reviewed by / Date:		
Shawn McChesney 12-3-09			Paul Elzy 12/9/09		



4.3.10 SU009B-Removed Drain Line and Related Site Soil Area

This survey package was added to include the survey of the end of the remaining site drain line after the building drain lines were removed, the soil in the trenches generated during the drain line removal and soil in the area where excavated soil was temporarily stored during drain line excavation.

Summary results are provided in Tables 4-11 and 4-12 which are followed by the survey package, survey forms with survey maps, survey data sheets, smear results from the Packard Tri-Carb Liquid Scintillation counter, charts presenting the survey data, and the laboratory analytical results.

Table 4-11: SU009B Summary Results

Summary Survey Unit 009B Removed Drain, Class 3	Beta	H-3 Smear (dpm/100cm ²)	C-14 Smear (dpm/100cm ²)
	Fixed Reading (dpm/100cm ²)		
Number	2	2	2
Average	5,510	707	181
Standard Deviation	0	127	14
Maximum	5,510	796	191

Table 4-12: SU009B Soil Summary Results

Summary Survey Unit 009 Soil Areas, Class 3	Gamma Points (μ R/hr)	H-3 in Soil (pCi/g)	C-14 in Soil (pCi/g)
Number	9	10	10
Average	9.0	20.63	1.80
Standard Deviation	0.3	32.63	8.20
Maximum	9.4	112.00	24.00



FSS Survey Package Worksheet for
EaglePicher SU009B

Package Identification No.: SU009B	Prepared by: Paul C. Ely
Location: Removed Drain Pipe & Related Site Soil Area	Date Prepared: 12/22/2009
Area Classification: Class 3	Signature: <i>Paul Ely</i>

Area Description

The survey area includes the remaining portion of the drain pipe and soil areas where the drain pipe was removed and areas where removed soil had been temporarily staged.

Historical Information

Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3.

General Survey Instructions

1. Perform soil surveys and sampling according to procedure CS-FO-PR-003 and this instruction.
2. Survey the interior end of the remaining section of drain pipe using a Ludlum Model 177 with 44-9 pancake G-M Detector. In addition obtain smears from the interior end of the pipe.
3. Use a 2" by 2" NaI detector, Ludlum model number 44-10, or equivalent as approved by the ES PM for exposure rate soil surveys. Obtain and record a dose rate measurement at each sample location at about 6-in above the soil surface.
4. Sample locations are indicated on the attached figure.
5. Using hand tools, obtain a ~ 1,000 ml surface sample (~0 to 6-in deep) from the sample location. Place the sample into a gallon size large Ziploc® type bag and label the container with the sample information. A Chain-Of-Custody form will be completed for each sample sent offsite.
6. After each use, thoroughly clean all parts of the soil sampling tool. Cleaning is accomplished with a nylon brush, clean water and phosphate-free soap. Then rinse with clean water.

Survey Package Worksheet SU009B (cont'd)

Special Instructions	
<ul style="list-style-type: none"> Source check instrumentation to Cs-137 for gamma measurements. Biased measurement and sampling locations were generated for this Class 3 survey package. The attached map provides measurement and sampling locations. 	<ul style="list-style-type: none"> Notify the ES Project Manager of locations that exceed measured activity 50% greater than the average activity. Attach photographic records if available and provide descriptive comments for each image under Survey Comments.

Survey Performance (Initial and date as each item is completed)													
Location Codes		General Description	Beta Scan	Survey Tech	Direct α, β, γ	Survey Tech	Direct Alpha	Survey Tech	H-3 & C-14 Smears	Survey Tech	Direct Gamma	Survey Tech	Soil Samples
L1	L2												
EaglePicher SU009B Class 3 Area													
Package ID	Surface or Structure	Material Code	Initial & Date	@60 sec	Initial & Date	@60 sec	Initial & Date	@10-cm	Initial & Date	@100 cm	Initial & Date	Survey Tech	Initial & Date
SU009B	P0001	B9999	N/A	1	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A	N/A
SU009B	L0001	B0016	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10	N/A	10	N/A
Survey Comments													
*See attached survey sheets.													
Package Review													
Surveyor(s) Signatures: On attached survey sheets													
Date Package Completed: 11/30/2009													
Package Review by and Date (Signature): Paul D. Ely 12/22/09													

Rev. 0

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Page 2 of 5
12/22/09

RADIATION PROTECTION SURVEY FORM

Project ID: Eagle Picher			Survey Log #:		
Tech (print):			Location: Eagle Picher		RHWP #: N/A
Instrument(s) Used			Purpose of Survey		Date: 11-24-09
Model	S/N	Cal. Due	locations of Soil Samples	Time: 0800	Sample #: N/A
	N		taken after removal of	Sample #:	
	A		drain lines & spoil piles.	Air Sample #:	
			N A	A/S Results (DAC):	✓
			All dose rates in uR/hr unless noted.	Smear #	Contamination (dpm/100 cm ²)
					alpha beta
LAB AREA N				1	
				2	
				3	
				4	
				5	
				6	
				7	
				8	
				9	N A
				10	
				11	
				12	
				13	
				14	
				15	
				16	
				17	
				18	
				19	
				20	
<p>Static Point Reading of Soil Sample Locations</p> <p>B-1 8961 B-2 8818 B-3 8709 B-4 8220</p> <p>B-5 8702 B-6 9072 B-7 9229 B-8 8910</p> <p>B-9 9245 Background: 8920</p> <p>Cal Date 04/21/09 Cal Due 04-21-10</p>			<p>LAW - Large Area Wipe</p> <p>O - α/β Smear</p> <p>□ - Tritium Smear</p> <p>Δ - Air Sample</p> <p># - Direct trisk</p> <p>* - contact/18 inch xx - RCA Boundary</p> <p>H - Head Level</p> <p>F - Foot level</p> <p>K = 1000</p>		
<p>COMMENTS: METER 2350 - 1 # 17573 w 44-10 Probe # 157372</p> <p>Samples of Soil of drain Line AFTER Removal of drain Line</p>					
Performed By / Date:			Reviewed by / Date:		
RK 11-24-09			11-30-2009		

RADIATION PROTECTION SURVEY FORM

Project ID: Eagle Picher			Survey Log #: EP-09-092		
Tech (print): Richard P. Stoney			Location: EAGLE PICHER		
Instrument(s) Used			Purpose of Survey		
Model	S/N	Cal. Due	Post Demolition Smear Survey		
L-177	45602	10-1-2010	of pipe running West to East		
44-9	176080	10-1-2010	to Main Municipal Sewage		
			System.		
			All dose rates in uR/hr unless noted.		
			Smear #	Contamination (dpm/100 cm ²)	
				alpha	beta
			1 *	SEE ATTACHED	
			2 *	↓	↓
			3		
			4		
			5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		
			20		
			<p>LAW - Large Area Wipe * - contact/18 inch</p> <p>O - α/β Smear H - Head Level</p> <p>□ - Tritium F - Foot level</p> <p>Smear K = 1000</p> <p>Δ - Air Sample</p> <p># - Direct frisk</p>		
<p>*** Denotes pipe (contaminated) Removed from Excavation and Placed in Intermediate Container for Shipment and Burial.</p> <p>COMMENTS: * Post Demolition of Piping Smears were taken to "Aptuit" for Counting.</p>			<p>Smears #1, #2 Taken on The interior of pipe surveyed To <100ncpm above Background.</p>		
Performed By / Date:			Reviewed by / Date:		
<p>Richard P. Stoney</p> <p>11-24-2009</p>			<p>[Signature]</p> <p>11/24/2009</p>		

Survey EP-09-092

11/24/2009 10:39:26 AM QuantaSmart (TM) - 2.03 - Serial# 061925 Page # 1
Protocol# 2 - WIPES.lsa User: CLINDT

Assay Definition-

Assay Description:

Assay Type: DPM (Dual)
Report Name: WIPE TEST
Output Data Path: C:\Packard\Tricarb\Results\CLINDT\WIPES\20091124_1032
Raw Results Path: C:\Packard\Tricarb\Results\CLINDT\WIPES\20091124_1032\20091124_1032.results
Assay File Name: C:\Packard\TriCarb\Assays\WIPES.lsa

Count Conditions-

Nuclide: 3H-14C
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Sets:
Low Energy: 3H
Mid Energy: 14C
Count Time (min): 1.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	0.0	0.0	1st Vial

Count Corrections-

Static Controller: On Luminescence Correction: n/a
Colored Samples: Off Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off
Regions Half Life Units Reference Date Reference Time
A
B
C

Cycle 1 Results		H-3	C-14	H-3	C-14	SIS	tSIE	MESSAGES
S#	Count Time	CPMA	CPMB	DPM1	DPM2			
Missing vial 1.								
2	1.00	4	9	6	11	65.74	491.23	
3	1.00	81	151	617	191	17.66	132.82	
4	1.00	99	142	796	171	16.36	134.55	

Page 2 of 2

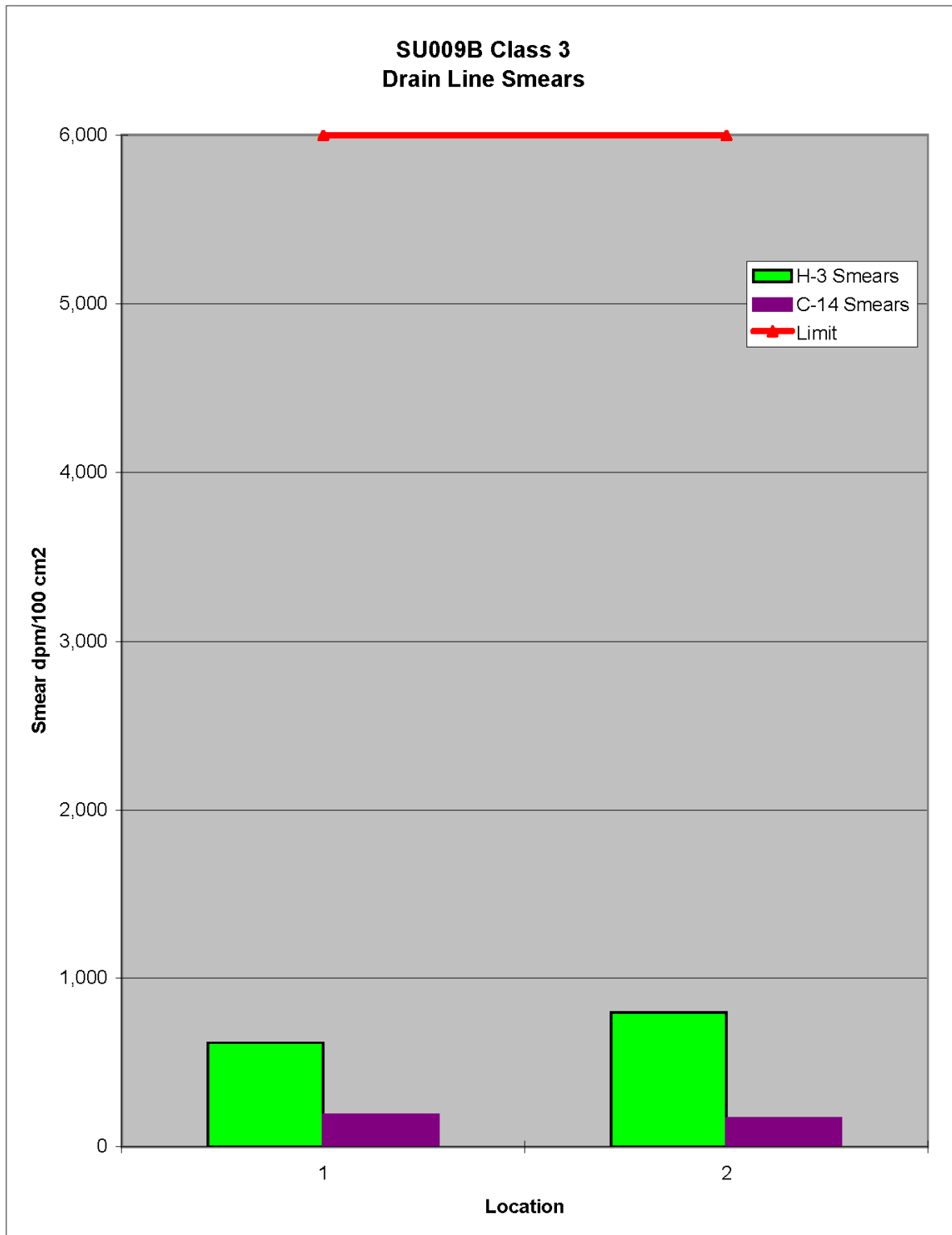
5 of 5
PCE 12/22/09

**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

EaglePicher FSS Data Sheet
Survey Unit 009B
Remaining Drain Line Survey

Detector Type	Detector SN	Detector (cm ²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 44-9	176080	15	10/1/10	177	45602	10/1/10
Survey	Loc.*		$\alpha + \beta + \gamma$ Fixed Reading (cpm/100cm ²)	H-3 Smear (dpm/100cm ²)	Limit (dpm/100cm ²)	C-14 Smear (dpm/100cm ²)
Point	Loc.*					
1	P	Pipe	5,510	617.0	6,000	191.0
2	P	Pipe	5,510	796.0	6,000	171.0
Average			5,510	706.5		181.0
Standard Deviation			0	126.6		14.1
Maximum			5,510	796.0		191.0
* R = Roof, F = Floor, W = Wall, C = Ceiling, E = Equipment						



**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

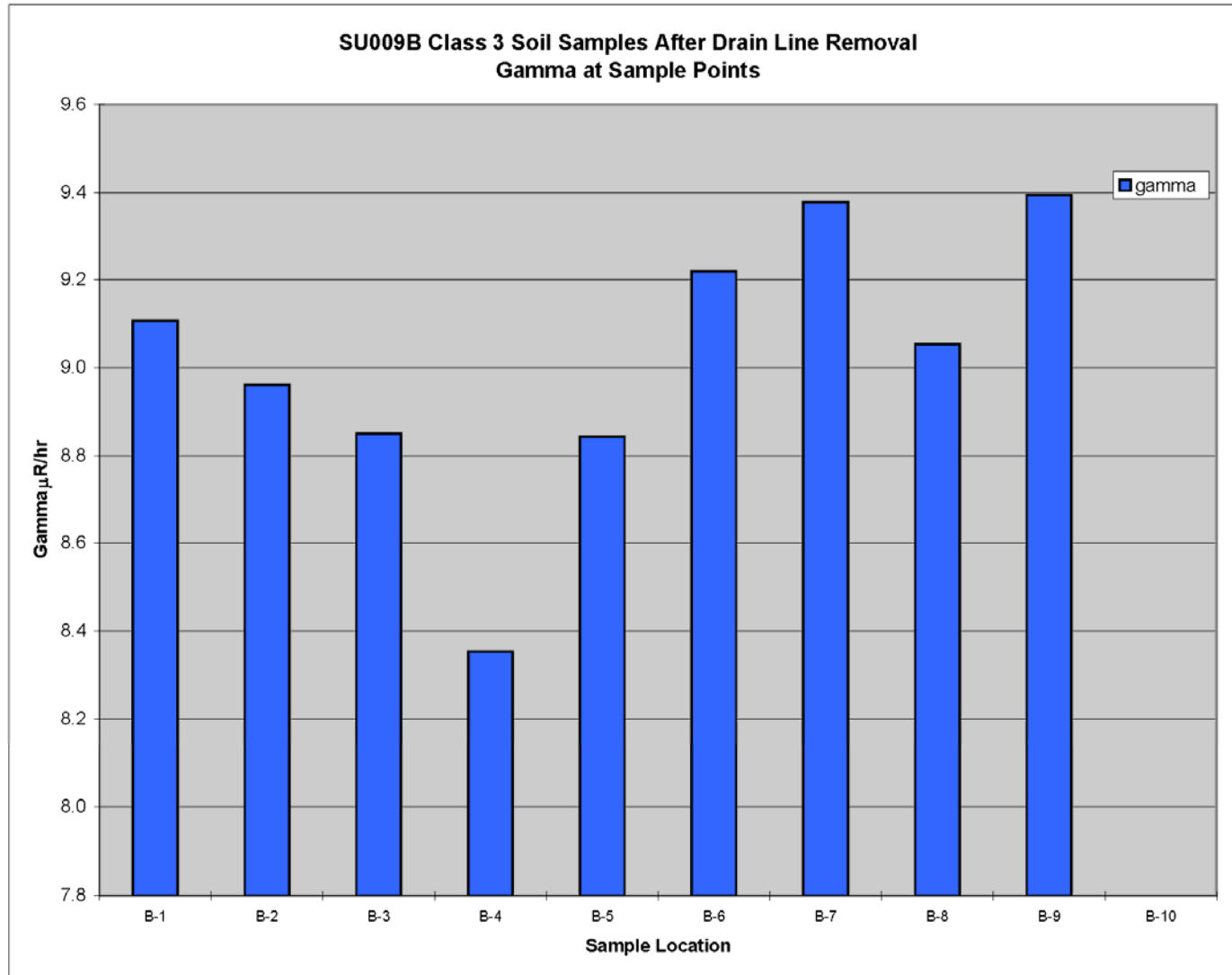
EaglePicher FSS Data Sheet

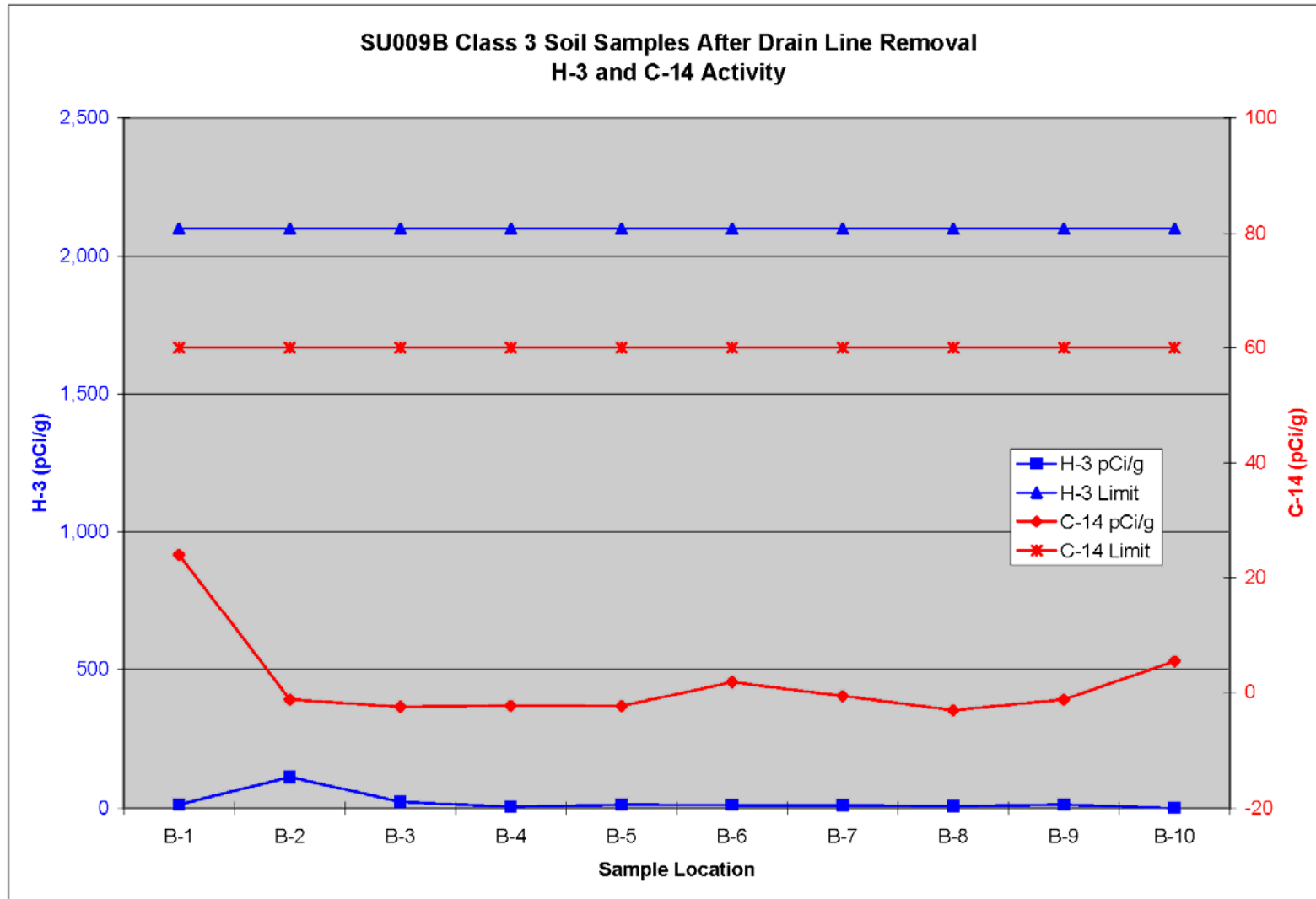
Survey Unit 009B

Soil Samples After Drain Line Removal

Detector Type	Detector SN	Detector (cm ²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due	Background (cpm)
Ludlum 44-10 (gamma)	157372	2x2 NaI	4/21/10	2350-1	117573	4/18/10	8,920
Detector Calibration Constant (Counts/R):		5.904E+10					

Survey Point	Loc.*	Gamma	Gamma	H-3		C-14	
		Fixed Reading (cpm)	Fixed Reading (μR/hr)	Sample (pCi/g)	Limit (pCi/g)	Sample (pCi/g)	Limit (pCi/g)
B-1	Soil	8,961	9.1	12.400	2,100	24.000	60
B-2	Soil	8,818	9.0	112.000	2,100	-1.210	60
B-3	Soil	8,709	8.9	22.400	2,100	-2.480	60
B-4	Soil	8,220	8.4	4.990	2,100	-2.270	60
B-5	Soil	8,702	8.8	12.400	2,100	-2.340	60
B-6	Soil	9,072	9.2	11.000	2,100	1.770	60
B-7	Soil	9,229	9.4	10.700	2,100	-0.599	60
B-8	Soil	8,910	9.1	7.350	2,100	-3.040	60
B-9	Soil	9,245	9.4	12.900	2,100	-1.210	60
B-10	Soil			0.110	2,100	5.400	60
Average	Soil	8,874	9.0	20.625		1.802	
Standard Deviation	Soil	316	0.3	32.626		8.200	
Maximum	Soil	9,245	9.4	112.000		24.000	





4.3.11 SU010-Mechanical Room Floor

The Machine Room floor had some areas in excess of limits (60,000 dpm/100 cm²). Most of these areas were decontaminated and the Machine Room floor was changed to a Class 1 area (SU010) and resurveyed. One area of the floor was removed as radioactive waste and this area was removed from the Final Status Survey (FSS).

Summary results are provided in Table 4-13 which is followed by the survey package, a survey map, survey data sheets, charts presenting the survey data, instrument download reports and the smear results from the Packard Tri-Carb Liquid Scintillation counter.

Table 4-13: SU010 Summary Results

Summary Survey Unit 010 Mechanical Room Floor, Class 1	Beta	Beta Scan	H-3 Smear (dpm/100cm ²)	C-14 Smear (dpm/100cm ²)
	Fixed Reading (dpm/100cm ²)	Maximums (dpm/100cm ²)		
Number	21	21	21	21
Average	11,283	11,403	85	84
Standard Deviation	6,673	N/A	61	39
Maximum	31,874	50,394	240	165



FSS Survey Package Worksheet for
EaglePicher SU010

Package Identification No.: SU10F/SU10S	Prepared by: Paul C. Ely
Location: Mechanical Room	Date Prepared: 10/28/2009
Area Classification: Class 1	Signature: <i>Paul Ely</i>

Area Description

The survey area includes the floors only.

Historical Information

Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3.

General Survey Instructions

1. Use gas proportional detector model numbers 43-68, or equivalent detector as approved by the ES PM for beta surface activity surveys. The total instrument efficiency should use the following factors:
 - ϵ_i , 2 π instrument efficiency from calibration papers. If a 4 π efficiency is reported, calculate the 2 π efficiency as follows using a 5% beta Back Scatter factor (BS). $\epsilon_i = (2 * \epsilon_{4\pi}) \backslash (1 + BS)$
 - ϵ_s , the beta surface efficiency is 25%.
 - ϵ_t , the total beta efficiency = $\epsilon_i * \epsilon_s$
2. Perform surface scans at a scan speed of 1 probe width per second or less for the 43-68. Any locations that exceed 2,500 cpm beta above background should be marked with a felt tip pen or equivalent and the extent of the elevated area recorded.
 - 100% scan of floor for beta contamination.
3. Perform direct beta surface activity measurements at each measurement location. Mark the survey locations with a felt tip pen or equivalent. All surveys locations are referenced from the southwest corner of the survey unit. Systematic survey locations were generated for this class 1 survey unit.
4. Collect a removable surface activity sample (smear) over an area of 100 cm² in size at each measurement location provided on survey maps and place the smear in a liquid scintillation vial immediately after it was taken.

Special Instructions

- | | |
|--|--|
| <ul style="list-style-type: none"> • Source check instrumentation to C-14 for beta measurements. • The static MDC for total beta activity measurements shall be less than 3,000 dpm/100 cm². • Perform a minimum of three one-minute field backgrounds using the plastic shield on the survey surface. • Log scan measurements or record maximum scan measurement results in cpm on a Grid Scan Record. | <ul style="list-style-type: none"> • Measurement and sampling locations are based on a random-start rectangular pattern. If any location is inaccessible, offset the measurement location to the nearest usable location and document the x and y coordinates for the location used. • The attached map provides floor measurement and sampling locations. |
|--|--|

Survey Performance (Initial and date as each item is completed)

[illegible]

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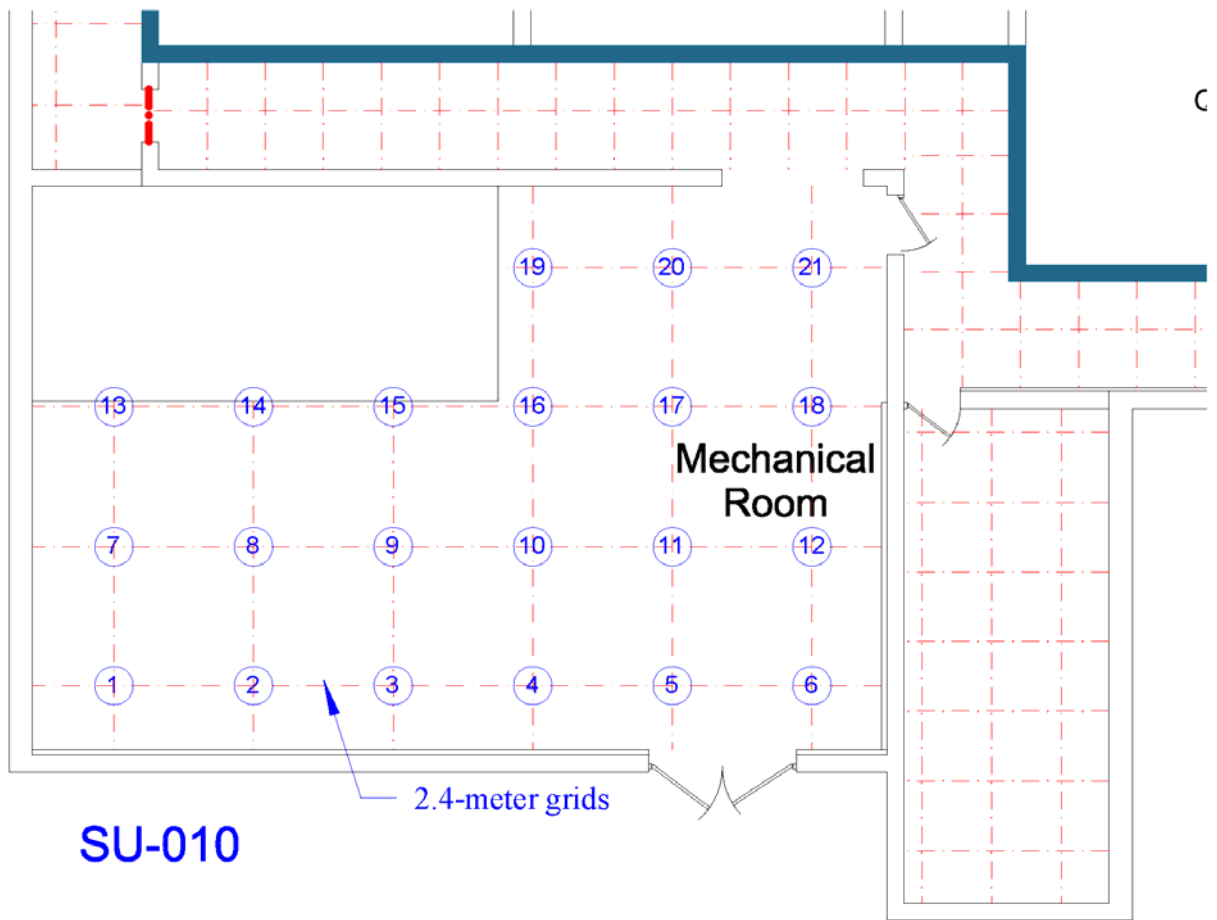


Figure 4-11 SU010 Survey Map

Final Status Survey Report for EaglePicher, Lenexa, Kansas

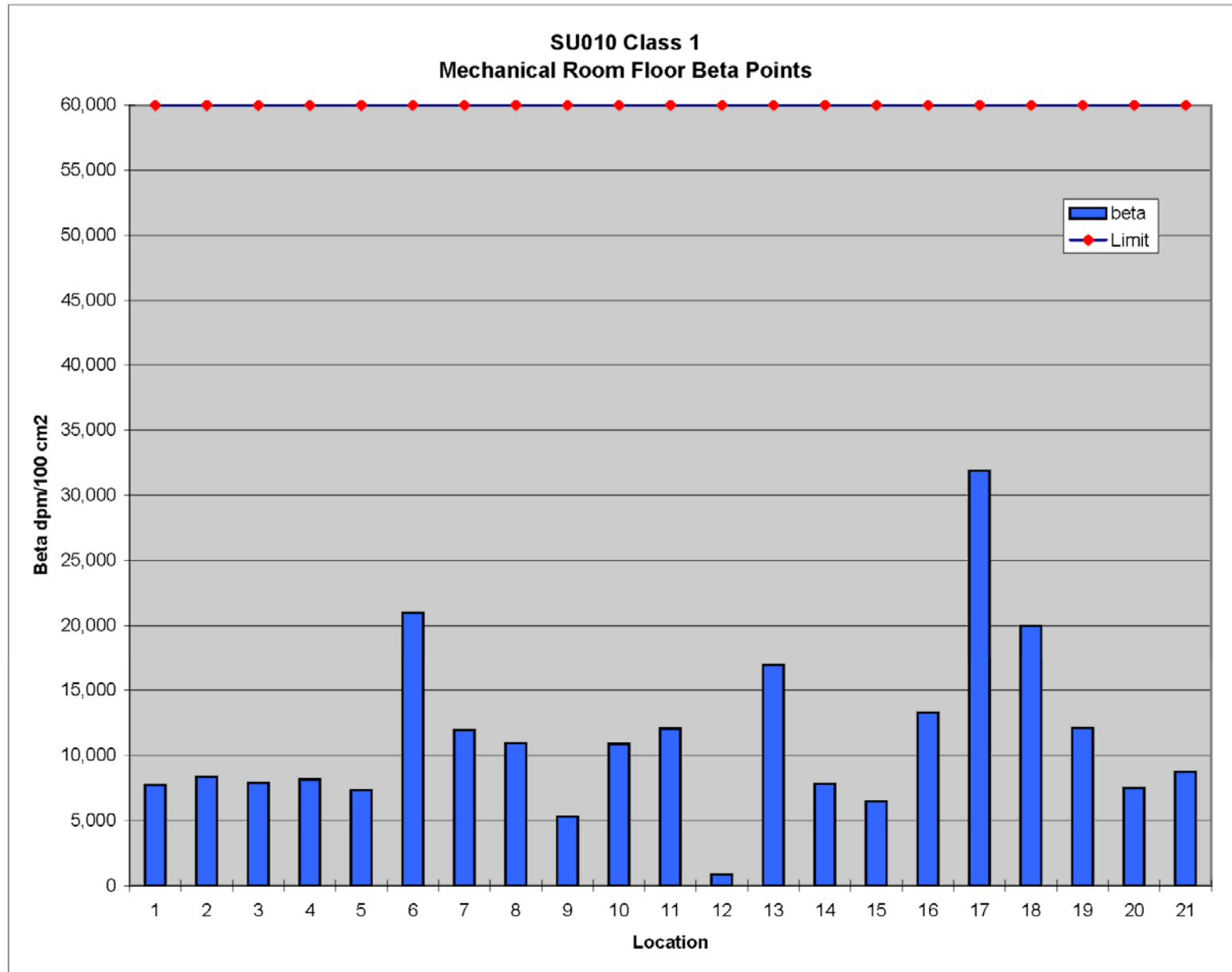
CS-HP-PN-018
Revision 1

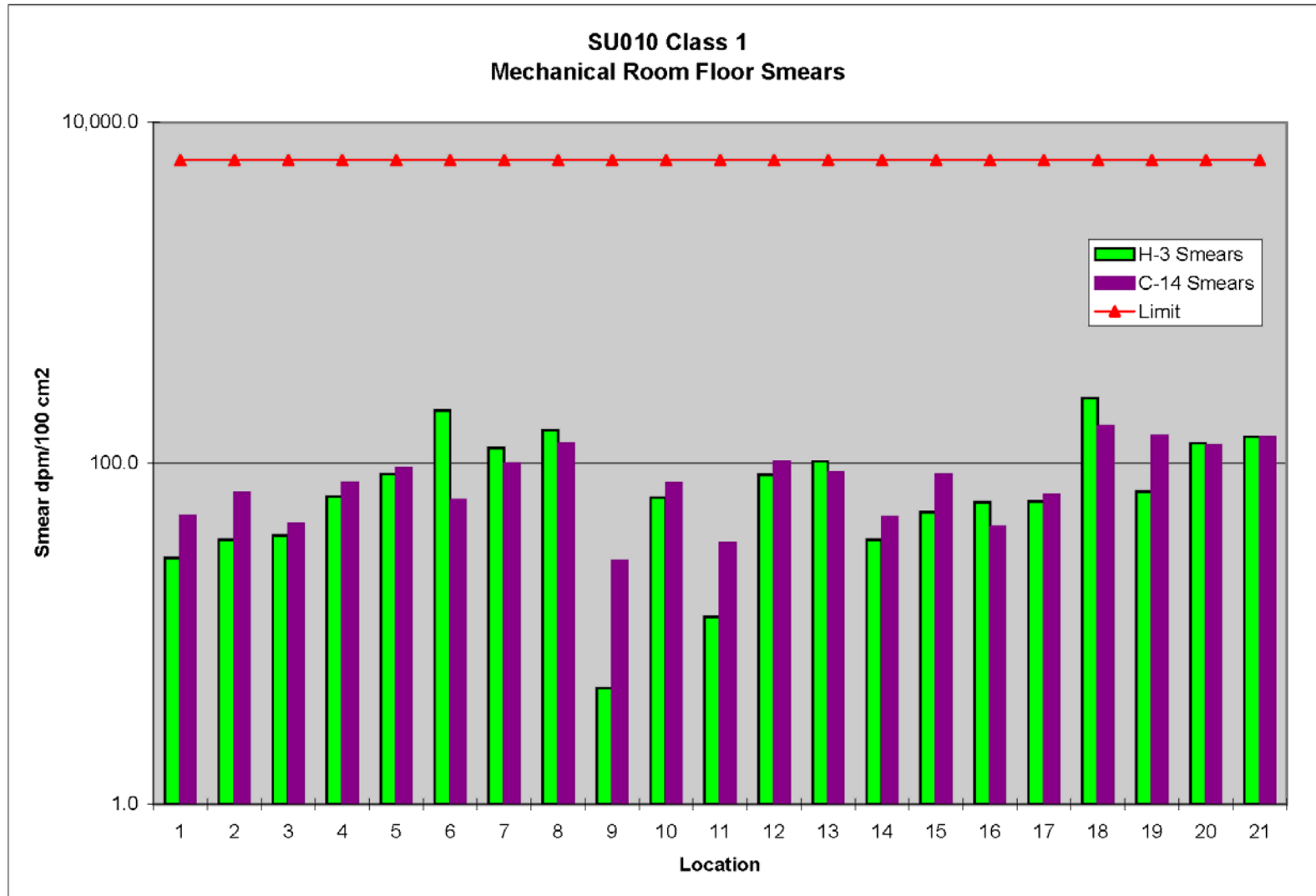
EaglePicher FSS Data Sheet
Survey Unit 010
Mechanical Room

Detector Type	Detector SN	Detector	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 43-68 (beta)	095523	(cm ²) 126	9/30/10	2350-1	80502	9/30/10
Packard Tri-Carb B2555	401663	NA	Daily	NA	NA	NA

Survey			Beta		H-3		C-14
			Fixed Reading	Limit	Smear	Limit	Smear
Point	Loc.*		(dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)
1	1	Floor	7,715	60,000	27.8	6,000	49.4
2	2	Floor	8,344	60,000	35.6	6,000	67.1
3	3	Floor	7,902	60,000	37.9	6,000	43.8
4	4	Floor	8,146	60,000	63.7	6,000	77.3
5	5	Floor	7,307	60,000	86.0	6,000	92.8
6	6	Floor	20,966	60,000	202.0	6,000	60.9
7	7	Floor	11,922	60,000	122.3	6,000	99.0
8	8	Floor	10,955	60,000	155.2	6,000	130.3
9	9	Floor	5,291	60,000	4.8	6,000	26.9
10	10	Floor	10,862	60,000	62.6	6,000	76.0
11	11	Floor	12,039	60,000	12.6	6,000	34.1
12	12	Floor	874	60,000	85.1	6,000	101.8
13	13	Floor	16,945	60,000	101.6	6,000	88.1
14	14	Floor	7,808	60,000	35.7	6,000	48.5
15	15	Floor	6,445	60,000	51.5	6,000	85.6
16	16	Floor	13,274	60,000	59.1	6,000	42.3
17	17	Floor	31,874	60,000	59.6	6,000	64.8
18	18	Floor	19,987	60,000	240.3	6,000	164.5
19	19	Floor	12,074	60,000	68.0	6,000	143.5
20	20	Floor	7,482	60,000	130.2	6,000	127.7
21	21	Floor	8,729	60,000	141.8	6,000	140.9
Average	F	Floor	11,283		84.9		84.1
Standard Deviation	F	Floor	6,673		61.4		39.2
Maximum	F	Floor	31,874		240.3		164.5

* R = Roof, F = Floor, W = Wall, C = Ceiling, E = Equipment







M2350-1 Download BETA Report

File Name : 00000038		Survey Description : SU010F Mechanical Romm Points 1-21	
Survey Reason : Final Status			
User ID : CCB6686		Technician Name : Catherine Barba-Abay	
Instrument Model : 2350-1	Instrument S/N : 80502	Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b	Detector S/N : 095523	Detector Cal. Due : 9/30/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm2 Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0681	Survey Date : 10/28/2009	
Minimum Net DPM Observed : -128	Mean Net DPM : 11019		
Maximum Net DPM Observed : 45754	STDEV Observed : 10030	# of Samples Taken : 26	

Catherine Barba-Abay
Print Name

Signature

Date

10/28/09

Print Name

Signature

Date

Comments:

Scanned and all results were less than
3000 cpm above background. This is equivalent to
 $30,068 \text{ dpm}/100 \text{ cm}^2$, $3000 \text{ cpm} \rightarrow 420 \text{ cpm (background)}$ $\div 2580 \text{ cpm}$
 $2580 \text{ cpm} \div 0.0681 \text{ cpm/dpm (Efficiency)} \div 126 \text{ cm}^2 \times 100 \text{ cm}^2$
 $= 30,068 \text{ dpm}/100 \text{ cm}^2$ PEly

Sign-Off

Paul Ely
Print Name

Signature

Date

10/29/09

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000038

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU10F	F01	0	409.0	60	FLDBK	B9999	ZZZZZ	1	420	-128
SU10F	F01	1	1,082.0	60	FLDCT	B9999	ZZZZZ	1	420	7,715
SU10F	F01	2	1,136.0	60	FLDCT	B9999	ZZZZZ	2	420	8,044
SU10F	F01	3	1,098.0	60	FLDCT	B9999	ZZZZZ	3	420	7,902
SU10F	F01	4	1,119.0	60	FLDCT	B9999	ZZZZZ	4	420	8,146
SU10F	F01	5	1,047.0	60	FLDCT	B9999	ZZZZZ	5	420	7,307
SU10F	F01	6	2,219.0	60	FLDCT	B9999	ZZZZZ	6	420	20,966
SU10F	F01	7	1,443.0	60	FLDCT	B9999	ZZZZZ	7	420	11,922
SU10F	F01	8	1,360.0	60	FLDCT	B9999	ZZZZZ	8	420	10,955
SU10F	F01	9	874.0	60	FLDCT	B9999	ZZZZZ	9	420	5,291
SU10F	F01	10	1,352.0	60	FLDCT	B9999	ZZZZZ	10	420	10,862
SU10F	F01	11	1,453.0	60	FLDCT	B9999	ZZZZZ	11	420	12,039
SU10F	F01	12	438.0	60	FLDBK	B9999	ZZZZZ	2	420	221
SU10F	F01	13	486.0	60	FLDCT	B9999	ZZZZZ	12	420	874
SU10F	F01	14	1,874.0	60	FLDCT	B9999	ZZZZZ	13	420	16,945
SU10F	F01	15	1,090.0	60	FLDCT	B9999	ZZZZZ	14	420	7,808
SU10F	F01	16	973.0	60	FLDCT	B9999	ZZZZZ	15	420	6,445
SU10F	F01	17	1,559.0	60	FLDCT	B9999	ZZZZZ	16	420	13,274
SU10F	F01	18	3,155.0	60	FLDCT	B9999	ZZZZZ	17	420	31,874
SU10F	F01	19	2,135.0	60	FLDCT	B9999	ZZZZZ	18	420	19,987
SU10F	F01	20	1,456.0	60	FLDCT	B9999	ZZZZZ	19	420	12,074
SU10F	F01	21	1,062.0	60	FLDCT	B9999	ZZZZZ	20	420	7,482
SU10F	F01	22	1,189.0	60	FLDCT	B9999	ZZZZZ	21	420	8,729
SU10F	F01	23	413.0	60	FLDBK	B9999	ZZZZZ	3	420	-92
ZZZZZ	ZZZZZ	24	3,256.0	600	PTBBK	B9999	ZZZZZ	1	0	3,795
ZZZZZ	ZZZZZ	25	3,826.0	60	PTSC1	B9999	ZZZZZ	1	0	45,754

Beta Flag 45000 -
Beta Max Flag 60000

Wednesday, October 28, 2009

Page 2 of 2



M2350-1 Download BETA Report

File Name : 00000043			Survey Description : SU10 Scans plus post decon points		
Survey Reason : Final Status					
User ID : RPS2366		Technician Name : Richard Stoney			
Instrument Model : 2350-1		Instrument S/N : 95359		Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b		Detector S/N : 119337		Detector Cal. Due : 9/30/2010	
Measurement Type : BETA		Detector Type : 02200 : 126 cm2 Gas Proportional Detector			
Detector Area : 126		Efficiency : 0.0938		Survey Date : 10/29/2009	
Minimum Net DPM Observed: -203		Mean Net DPM: 22702			
Maximum Net DPM Observed: 128490		STDEV Observed: 34113		# of Samples Taken: 35	

Richard Stoney
Print Name

Signature

Date

Print Name

Signature

Date

Comments:

Scans

Sign-Off

Paul Ely
Print Name

Signature

11/2/09
Date

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000043

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)	
ZZZZ	ZZZZ	0	3,683.0	600	PRBBK	B0002	ZZZZZ	0	0	3,116	
ZZZZ	ZZZZ	1	4,156.0	60	PRSC1	B0002	ZZZZZ	1	0	35,164	
ZZZZ	ZZZZ	2	4,278.0	60	PRSC1	B0002	ZZZZZ	0	0	30,197	
SU10	FL01	3	1,314.0	60	FLDCT	B0002	ZZZZZ	1	595	6,084	
SU10	FL01	4	3,322.0	60	FLDCT	B0002	ZZZZZ	2	595	23,073	see # 22
SU10	FL01	5	1,423.0	60	FLDCT	B0002	ZZZZZ	3	595	7,006	
SU10	FL01	6	6,551.0	60	FLOCT	B0002	ZZZZZ	4	595	50,394	
SU10	FL01	7	15,502.0	60	FLDCT	B0002	ZZZZZ	5	595	126,130	see # 21
SU10	FL01	8	2,712.0	60	FLDCT	B0002	ZZZZZ	6	595	17,912	
SU10	FL01	9	1,620.0	60	FLDCT	B0002	ZZZZZ	7	595	8,673	
SU10	FL01	10	2,607.0	60	FLDCT	B0002	ZZZZZ	8	595	17,024	see # 29
SU10	FL01	11	1,381.0	60	FLDCT	B0002	ZZZZZ	9	595	6,650	
SU10	FL01	12	1,343.0	60	FLDCT	B0002	ZZZZZ	10	595	6,329	
SU10	FL01	13	2,302.0	60	FLDCT	B0002	ZZZZZ	11	595	14,443	see # 30
SU10	FL01	14	1,428.0	60	FLDCT	B0002	ZZZZZ	12	595	7,048	
SU10	FL01	15	15,781.0	60	FLDCT	B0002	ZZZZZ	13	595	128,490	see # 26
SU10	FL01	16	1,511.0	60	FLDCT	B0002	ZZZZZ	14	595	7,750	
SU10	FL01	17	13,959.0	60	FLDCT	B0002	ZZZZZ	15	595	113,074	see # 23
SU10	FL01	18	1,456.0	60	FLDCT	B0002	ZZZZZ	16	595	7,285	
SU10	FL01	19	5,057.0	60	FLDCT	B0002	ZZZZZ	17	595	37,753	see # 27
SU10	FL01	20	3,132.0	60	FLDCT	B0002	ZZZZZ	18	595	21,466	
SU10	FL01	21	796.0	60	FLDCT	B0002	PTDCN	5	595	1,701	see # 28
SU10	FL01	22	1,956.0	60	FLDCT	B0002	PTDCN	2	595	11,516	
SU10	FL01	23	787.0	60	FLDCT	B0002	PTDCN	20	595	1,625	
SU10	FL01	24	7,169.0	60	FLDCT	B0002	ZZZZ	21	595	55,823	
SU10	FL01	25	1,860.0	60	FLDCT	B0002	ZZZZ	19	595	10,703	
SU10	FL01	26	797.0	60	FLDCT	B0002	PTDCN	18	595	1,709	
SU10	FL01	27	1,419.0	60	FLDCT	B0002	PTDCN	18	595	6,972	
SU10	FL01	28	1,453.0	60	FLDCT	B0002	PTDCN	21	595	7,260	
SU10	FL01	29	2,275.0	60	FLDCT	B0002	PTDCN	13	595	14,215	
SU10	FL01	30	856.0	60	FLDCT	B0002	PTDCN	14	595	2,208	
SU10	FL01	31	573.0	60	FLDBK	B0002	ZZZZ	21	595	-186	
SU10	FL01	32	571.0	60	FLDBK	B0002	ZZZZ	5	595	-203	
SU10	FL01	33	550.0	60	FLDBK	B0002	ZZZZ	14	595	465	
SU10	FL01	34	585.0	60	FLDBK	B0002	ZZZZ	2	595	-85	

Beta Flag

45000 -

Beta Max Flag

60000

Thursday, October 29, 2009

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**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

29 Oct 2009 08:55 ALPHA/BETA - 1.09 Page #1
Protocol #:24 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Background Subtract: 1st Vial Low Energy: 3H
High Energy: 14C

	LL	UL	LCR	25%	BKG
Region A:	0.0 - 12.0		0	0.0	9.45
Region B:	12.0 - 156		0	0.0	14.89
Region C:	0.0 - 0.0		0	0.0	0.00

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA24.003

P#PID S#	SMPL_ID	TIME	CPMAA:25%	CPMBB:25%	H-3 DPM1	C-14 DPM2	tSIE FL
AG							
24 9 1		10.0	9.4 20.6	14.9 16.4			422
B							
24 9 2	SU10 F1	1.0	13.6 72.2	41.1 36.9	27.81	49.35	369
W							
24 9 3	SU10 F2	1.0	17.3 60.9	55.5 30.5	35.64	67.05	354
W							
24 9 4	SU10 F3	1.0	16.4 63.0	37.2 39.3	37.85	43.82	386
W							
24 9 5	SU10 F4	1.0	26.7 45.7	65.0 27.8	63.74	77.25	359
W							
24 9 6	SU10 F5	1.0	34.3 39.0	78.4 24.8	85.98	92.84	353
W							
24 9 7	SU10 F6	1.0	70.3 25.5	58.3 29.6	202.04	60.94	395
W							
24 9 8	SU10 F7	1.0	46.5 32.4	85.1 23.7	122.32	98.99	366
W							
24 9 9	SU10 F8	1.0	55.1 29.4	110.6 20.4	155.15	130.25	330
W							
24 9 10	SU10 F9	1.0	4.5 172	22.2 56.0	4.79	26.94	401
W							
24 9 11	SU10 F10	1.0	26.6 45.8	64.1 28.0	62.62	76.03	366
W							
24 9 12	SU10 F11	1.0	7.5 113	28.2 47.4	12.59	34.05	379
W							
24 16 13	SU10 F12	1.0	36.6 37.5	86.1 23.5	85.05	101.79	375
24 16 14	SU10 F13	1.0	38.4 36.4	75.3 25.4	101.59	88.13	355
24 16 15	SU10 F14	1.0	15.9 64.5	40.8 37.1	35.72	48.47	373
24 16 16	SU10 F15	1.0	23.6 49.4	71.1 26.3	51.54	85.61	350
24 16 17	SU10 F16	1.0	22.8 50.6	36.9 39.6	59.06	42.29	385
24 16 18	SU10 F17	1.0	25.4 47.1	55.2 30.6	59.62	64.83	385
24 16 19	SU10 F18	1.0	91.8 22.0	143.9 17.6	240.34	164.53	384
24 16 20	SU10 F19	1.0	28.0 42.6	115.9 19.8	68.00	143.48	280
24 16 21	SU10 F20	1.0	22.2 35.5	45.3 28.3	35.72	48.47	373

24 16 21	SU10 F20	1.0	51.9	30.4	108.7	20.6	130.22	127.71	366
24 16 22	SU10 F21	1.0	59.1	28.2	120.6	19.4	141.83	140.88	386
							H-3	C-14	
							DPM	DPM	

4.3.11 SU011-Mezzanine Stairwell

The Mezzanine Stairwell floor and steps had some areas in excess of limits (60,000 dpm/100 cm²). The floor and steps were decontaminated and the area resurveyed as a Class 1 area SU011).

Summary results are provided in Table 4-14 which is followed by the survey package, a survey map, survey data sheets, charts presenting the survey data, instrument download reports and the smear results from the Packard Tri-Carb Liquid Scintillation counter. Note that the survey map only indicates 21 survey locations. These locations are all on the floor, the remaining survey locations are on the center of each of 20 steps leading to the mezzanine.

Table 4-14: SU011 Summary Results

Summary Survey Unit 011 Mezzanine Stairwell, Class 1	Beta	Beta Scan Maximums (dpm/100cm ²)	H-3 Smear (dpm/100cm ²)	C-14 Smear (dpm/100cm ²)
	Fixed Reading (dpm/100cm ²)			
Number	41	41	41	41
Average	23,977	20,475	56.1	42.9
Standard Deviation	9,242	N/A	38.5	35.7
Maximum	47,817	33,005	144.8	177.0



FSS Survey Package Worksheet for
EaglePicher SU011

Package Identification No.: SU11F/SU11S	Prepared by: Paul C. Ely
Location: Stairwell to Mezzanine	Date Prepared: 10/28/2009
Area Classification: Class 1	Signature: <i>Paul Ely</i>

Area Description

The survey area includes the floor in the stairwell area and the steps and landings up to the mezzanine.

Historical Information

Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3.

General Survey Instructions

1. Use gas proportional detector model numbers 43-68, or equivalent detector as approved by the ES PM for beta surface activity surveys. The total instrument efficiency should use the following factors:
 - ϵ_i , 2π instrument efficiency from calibration papers. If a 4π efficiency is reported, calculate the 2π efficiency as follows using a 5% beta Back Scatter factor (BS). $\epsilon_i = (2 * \epsilon_{4\pi}) \backslash (1 + BS)$
 - ϵ_s , the beta surface efficiency is 25%.
 - ϵ_t , the total beta efficiency = $\epsilon_i * \epsilon_s$
2. Perform surface scans at a scan speed of 1 probe width per second or less for the 43-68. Any locations that exceed 2,500 cpm beta above background should be marked with a felt tip pen or equivalent and the extent of the elevated area recorded.
 - 100% scan of floor, steps and landings for beta contamination.
3. Perform direct beta surface activity measurements at each floor measurement location and on each step or landing. Mark the survey locations with a felt tip pen or equivalent. All floor surveys locations are referenced from the southwest corner of the survey unit. Systematic survey locations were generated for this class 1 survey unit.
4. Collect a removable surface activity sample (smear) over an area of 100 cm² in size at each measurement location provided on survey maps and place the smear in a liquid scintillation vial immediately after it was taken.

Special Instructions

- Source check instrumentation to C-14 for beta measurements.
- The static MDC for total beta activity measurements shall be less than 3,000 dpm/100 cm².
- Perform a minimum of three one-minute field backgrounds using the plastic shield on the survey surface.
- Log scan measurements or record maximum scan measurement results in cpm on a Grid Scan Record.

- Floor measurement and sampling locations are based on a random-start rectangular pattern. If any location is inaccessible, offset the measurement location to the nearest usable location and document the x and y coordinates for the location used.
- The attached map provides floor measurement and sampling locations. Additional locations centered on each step and landing will be added by the survey technician.

Survey Performance (Initial and date as each item is completed)

[illegible]

Page 3 of 3

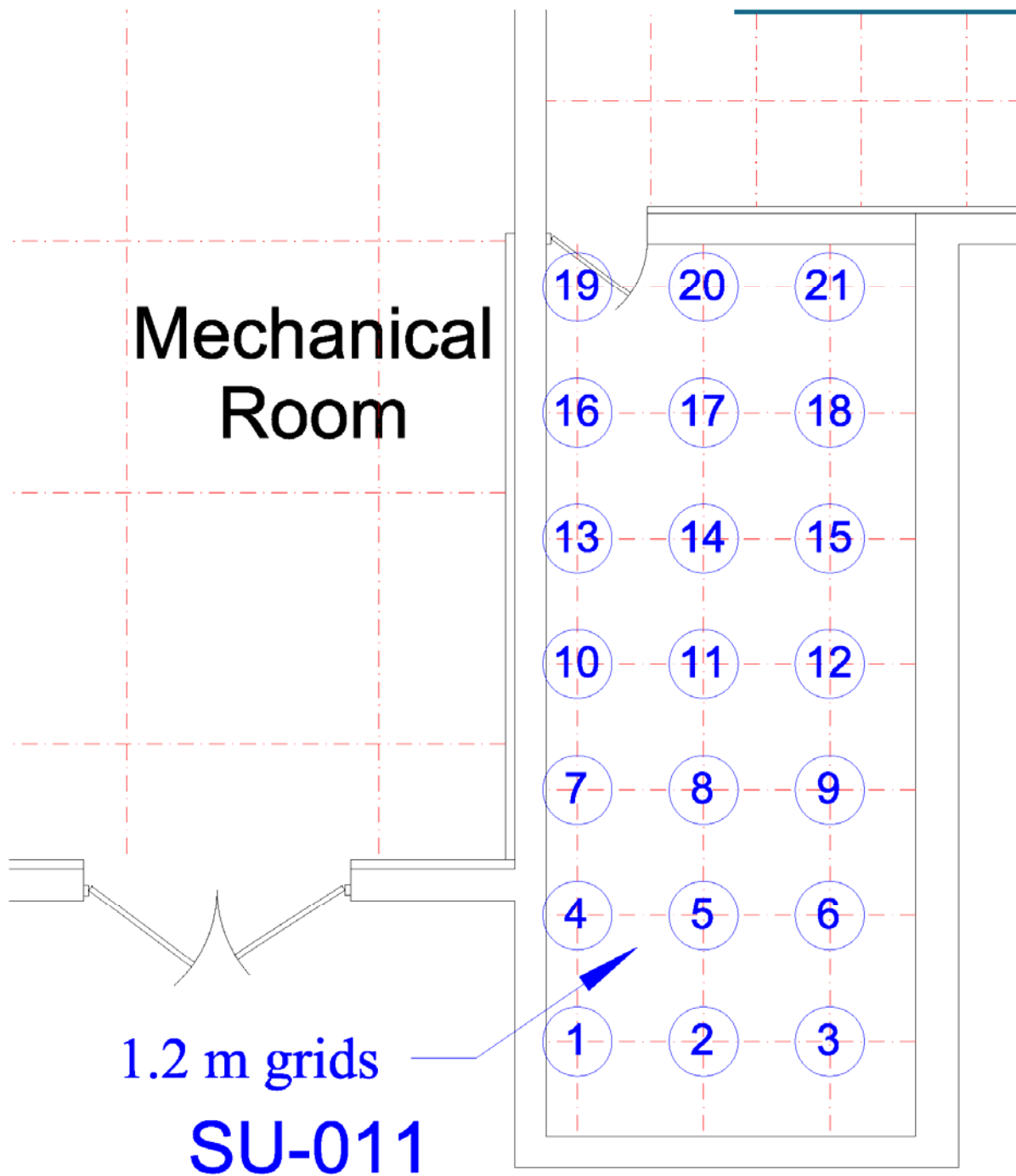


Figure 4-12 SU011 Survey Map

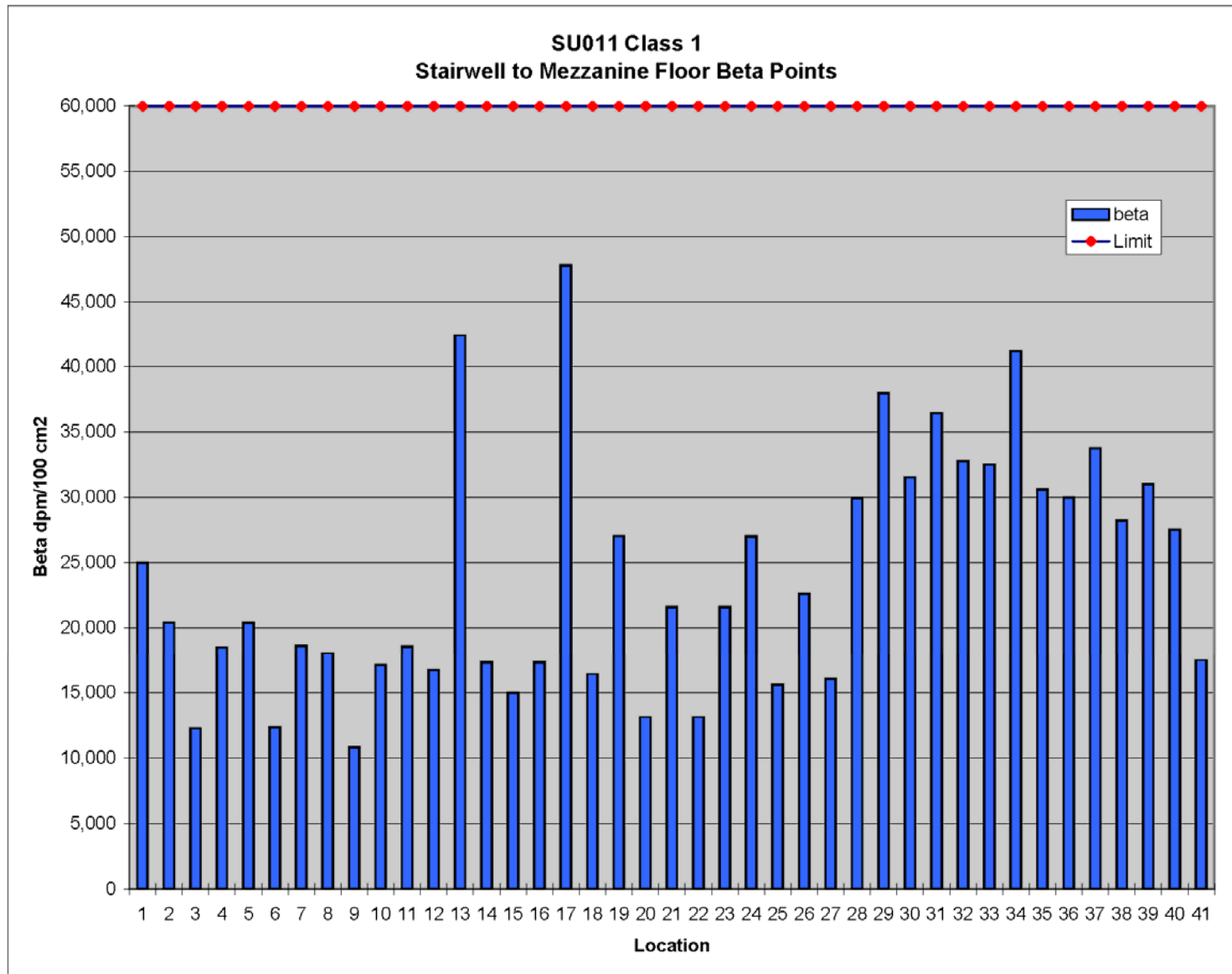
Final Status Survey Report for EaglePicher, Lenexa, Kansas

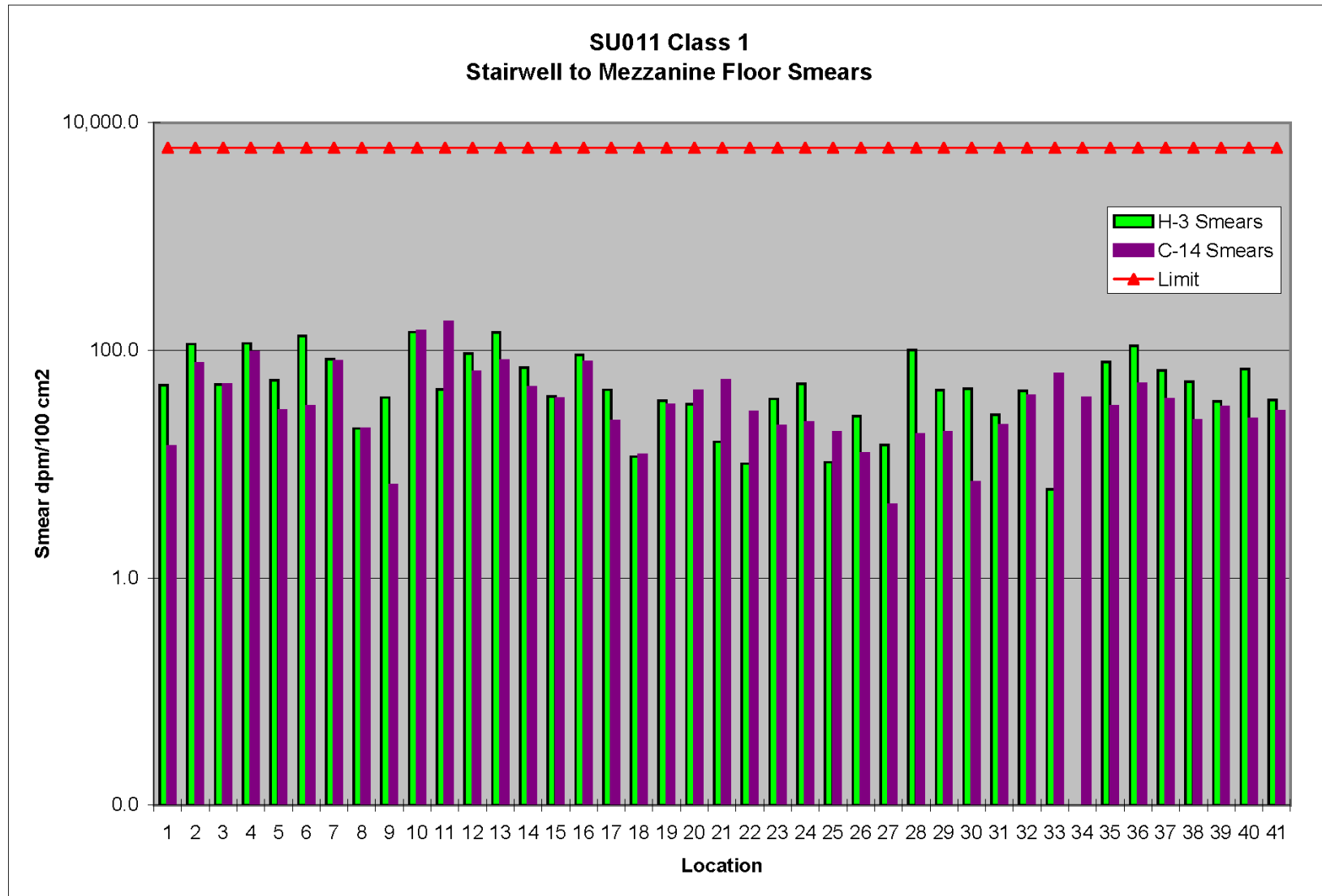
CS-HP-PN-018
Revision 1

EaglePicher FSS Data Sheet
Survey Unit 011
Stairwell to Mezzanine

		Detector						
Detector Type	Detector SN	(cm ²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due		
Ludlum 43-68 (beta)	095523	126	9/30/10	2350-1	80502	9/30/10		
Packard Tri-Carb B2555	401663	NA	Daily	NA	NA	NA		
		Beta		H-3		C-14		
Survey		Fixed Reading	Limit	Smear	Limit	Smear		
Point	Loc.*	(dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)		
1	1 Floor	24,975	60,000	49.6	6,000			14.3
2	2 Floor	20,395	60,000	113.5	6,000			76.4
3	3 Floor	12,260	60,000	50.1	6,000			49.9
4	4 Floor	18,472	60,000	115.2	6,000			97.0
5	5 Floor	20,383	60,000	54.5	6,000			29.6
6	6 Floor	12,353	60,000	134.1	6,000			32.1
7	7 Floor	18,612	60,000	83.9	6,000			80.2
8	8 Floor	18,017	60,000	20.6	6,000			20.5
9	9 Floor	10,838	60,000	38.5	6,000			6.6
10	10 Floor	17,097	60,000	144.8	6,000			148.7
11	11 Floor	18,553	60,000	45.4	6,000			177.0
12	12 Floor	16,712	60,000	93.3	6,000			64.6
13	13 Floor	42,375	60,000	143.9	6,000			81.2
14	14 Floor	17,295	60,000	70.5	6,000			47.7
15	15 Floor	14,952	60,000	39.5	6,000			38.0
16	16 Floor	17,295	60,000	91.4	6,000			79.1
17	17 Floor	47,817	60,000	45.1	6,000			23.8
18	18 Floor	16,409	60,000	11.7	6,000			12.2
19	19 Floor	27,026	60,000	36.0	6,000			33.4
20	20 Floor	13,123	60,000	33.5	6,000			44.2
21	21 Floor	21,584	60,000	15.7	6,000			54.8
22	22 Floor	13,123	60,000	10.1	6,000			29.0
23	23 Floor	21,584	60,000	37.4	6,000			21.8
24	24 Floor	26,979	60,000	50.7	6,000			23.3
25	25 Floor	15,558	60,000	10.4	6,000			19.2
26	26 Floor	22,597	60,000	26.4	6,000			12.5
27	27 Floor	16,013	60,000	14.7	6,000			4.4
28	28 Floor	29,916	60,000	100.5	6,000			18.2
29	29 Floor	37,969	60,000	44.6	6,000			19.0
30	30 Floor	31,513	60,000	45.8	6,000			6.9
31	31 Floor	36,419	60,000	27.2	6,000			22.0
32	32 Floor	32,760	60,000	44.2	6,000			40.1
33	33 Floor	32,480	60,000	6.0	6,000			62.3
34	34 Floor	41,174	60,000	0.0	6,000			38.1
35	35 Floor	30,569	60,000	79.2	6,000			32.5
36	36 Floor	29,963	60,000	109.9	6,000			51.0
37	37 Floor	33,739	60,000	66.9	6,000			37.2
38	38 Floor	28,203	60,000	53.0	6,000			24.4
39	39 Floor	31,000	60,000	35.6	6,000			32.1
40	40 Floor	27,492	60,000	68.4	6,000			25.1
41	41 Floor	17,470	60,000	36.8	6,000			29.1
Average		F Floor	23,977		56.1			42.9
Standard Deviation		F Floor	9,242		38.5			35.7
Maximum		F Floor	47,817		144.8			177.0

* R = Roof, F = Floor, W = Wall, C = Ceiling, E = Equipment







M2350-1 Download BETA Report

File Name : 00000042		Survey Description : SU11S Stairwell	
Survey Reason : Final Status			
User ID : SXM1098		Technician Name : Sharon McChesney	
Instrument Model : 2350-1	Instrument S/N : 80502	Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b	Detector S/N : 095523	Detector Cal. Due : 9/30/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm2 Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0681	Survey Date : 10/29/2009	
Minimum Net DPM Observed: -1353	Mean Net DPM: 27306		
Maximum Net DPM Observed: 125807	STDEV Observed: 21803	# of Samples Taken: 52	

Sharon McChesney
Print Name

Signature

Date

Print Name

Signature

Date

Comments:

Maximum scan less than 4000 cpm.
Scan data provided in download file #00000040. PEE

Sign-Off

Print Name

Signature

Date

Page 1 of 3

Duratek Beta Survey Report

Download File Name: 00000042

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
ZZZZZ	ZZZZZ	0	3,310.0	600	PRBBK	B9999	ZZZZZ	1	0	3,858
ZZZZZ	ZZZZZ	1	3,879.0	60	PRSC1	B9999	ZZZZZ	0	0	45,207
SU11S	F01	2	422.0	60	FLDBK	B9999	ZZZZZ	1	447	-291
SU11S	F01	3	2,590.0	60	FLDCT	B9999	ZZZZZ	1	447	24,975
SU11S	F01	4	2,197.0	60	FLDCT	B9999	ZZZZZ	2	447	20,395
SU11S	F01	5	1,499.0	60	FLDCT	B9999	ZZZZZ	3	447	12,260
SU11S	F01	6	2,032.0	60	FLDCT	B9999	ZZZZZ	4	447	18,472
SU11S	F01	7	2,198.0	60	FLDCT	B9999	ZZZZZ	5	447	20,383
SU11S	F01	8	1,507.0	60	FLDCT	B9999	ZZZZZ	6	447	12,363
SU11S	F01	9	2,044.0	60	FLDCT	B9999	ZZZZZ	7	447	18,612
SU11S	F01	10	1,993.0	60	FLDCT	B9999	ZZZZZ	8	447	18,017
SU11S	F01	11	1,377.0	60	FLDCT	B9999	ZZZZZ	9	447	10,838
SU11S	F01	12	1,914.0	60	FLDCT	B9999	ZZZZZ	10	447	17,097
SU11S	F01	13	2,039.0	60	FLDCT	B9999	ZZZZZ	11	447	18,553
SU11S	F01	14	1,881.0	60	FLDCT	B9999	ZZZZZ	12	447	16,712
SU11S	F01	15	4,083.0	60	FLDCT	B9999	ZZZZZ	13	447	42,375
SU11S	F01	16	6,378.0	60	FLDCT	B9999	ZZZZZ	14	447	69,121
SU11S	F01	17	1,730.0	60	FLDCT	B9999	ZZZZZ	15	447	14,952
SU11S	F01	18	2,267.0	60	FLDCT	B9999	ZZZZZ	16	447	21,211
SU11S	F01	19	4,550.0	60	FLDCT	B9999	ZZZZZ	17	447	47,817
SU11S	F01	20	1,855.0	60	FLDCT	B9999	ZZZZZ	18	447	16,409
SU11S	F01	21	7,114.0	60	FLDCT	B9999	ZZZZZ	19	447	77,699
SU11S	F01	22	6,937.0	60	FLDCT	B9999	ZZZZZ	20	447	75,636
SU11S	F01	23	11,242.0	60	FLDCT	B9999	ZZZZZ	21	447	125,807
SU11S	F01	24	1,849.0	60	FLDCT	B9999	ZZZZZ	22	447	16,339
SU11S	F01	25	1,787.0	60	FLDCT	B9999	ZZZZZ	23	447	15,617
SU11S	F01	26	2,782.0	60	FLDCT	B9999	ZZZZZ	24	447	26,979
SU11S	F01	27	440.0	60	FLDBK	B9999	ZZZZZ	2	447	-82
SU11S	F01	28	1,782.0	60	FLDCT	B9999	ZZZZZ	25	447	15,558
SU11S	F01	29	2,386.0	60	FLDCT	B9999	ZZZZZ	26	447	22,587
SU11S	F01	30	1,821.0	60	FLDCT	B9999	ZZZZZ	27	447	16,013
SU11S	F01	31	3,014.0	60	FLDCT	B9999	ZZZZZ	28	447	29,918
SU11S	F01	32	3,705.0	60	FLDCT	B9999	ZZZZZ	29	447	37,969
SU11S	F01	33	3,151.0	60	FLDCT	B9999	ZZZZZ	30	447	31,513
SU11S	F01	34	3,572.0	60	FLDCT	B9999	ZZZZZ	31	447	36,419
SU11S	F01	35	3,258.0	60	FLDCT	B9999	ZZZZZ	32	447	32,760
SU11S	F01	36	3,234.0	60	FLDCT	B9999	ZZZZZ	33	447	32,480
SU11S	F01	37	3,980.0	60	FLDCT	B9999	ZZZZZ	34	447	41,174
SU11S	F01	38	3,070.0	60	FLDCT	B9999	ZZZZZ	35	447	30,569

Beta Flag 45000 -
Beta Max Flag 60000

Friday, October 30, 2009

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Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU11S	F01	39	3,018.0	60	FLDCT	B9999	ZZZZZ	36	447	29,963
SU11S	F01	40	3,342.0	60	FLDCT	B9999	ZZZZZ	37	447	33,739
SU11S	F01	41	2,867.0	60	FLDCT	B9999	ZZZZZ	38	447	28,203
SU11S	F01	42	3,107.0	60	FLDCT	B9999	ZZZZZ	39	447	31,000
SU11S	F01	43	2,806.0	60	FLDCT	B9999	ZZZZZ	40	447	27,492
SU11S	F01	44	1,946.0	60	FLDCT	B9999	ZZZZZ	41	447	17,470
SU11S	F01	45	474.0	60	FLDBK	B9999	ZZZZZ	3	447	315
SU11S	F01	46	1,931.0	60	PTDCN	B9999	ZZZZZ	14	447	17,295
SU11S	F01	47	2,766.0	60	PTDCN	B9999	ZZZZZ	19	447	27,026
SU11S	F01	48	1,573.0	60	PTDCN	B9999	ZZZZZ	20	447	13,123
SU11S	F01	49	2,299.0	60	PTDCN	B9999	ZZZZZ	21	447	21,584
SU11S	F01	50	3,309.0	600	PTBBK	B9999	ZZZZZ	1	447	-1,353
SU11S	F01	51	3,660.0	60	PTSC1	B9999	ZZZZZ	1	447	39,776

Beta Flag 45000 -
Beta Max Flag 60000

Friday, October 30, 2009

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**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

**CS-HP-PN-018
Revision 1**

29 Oct 2009 10:28 ALPHA/BETA - 1.09 Page #1
Protocol #: 1 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Background Subtract: 1st Vial Low Energy: 3H
High Energy: 14C

	LL	UL	LCR	2S%	BKG
Region A:	0.0 - 12.0		0	0.0	8.26
Region B:	12.0 - 156		0	0.0	19.84
Region C:	0.0 - 0.0		0	0.0	0.00

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA11.004

P#PID	S#	SMPL_ID	TIME	CPMAA:2S%	CPMBB:2S%	3H-DPM	14C-DPM	tSIE	FLAG
1 3 1			10.0	8.3 22.0	19.8 14.2	0.00	0.00	419	B
1 3 2	SU11 Floor#1	1.0	18.1 57.7	13.8 86.3	49.57	14.28	418		
1 3 3	SU11 Floor#2	1.0	44.7 32.8	67.2 28.1	113.45	76.44	401		
1 3 4	SU11 Floor#3	1.0	22.0 50.7	42.9 37.5	50.10	49.92	412		
1 3 5	SU11 Floor#4	1.0	47.8 31.6	84.1 24.5	115.24	97.02	404		
1 3 6	SU11 Floor#5	1.0	21.3 51.7	26.6 52.4	54.53	29.60	416		
1 3 7	SU11 Floor#6	1.0	44.2 33.0	31.7 46.1	134.10	32.14	379		
1 3 8	SU11 Floor#7	1.0	35.9 37.4	69.0 27.6	83.89	80.18	404		
1 3 9	SU11 Floor#8	1.0	9.3 92.5	17.6 71.2	20.63	20.47	426		
1 3 10	SU11 Floor#9	1.0	13.8 69.4	7.1 151	38.49	6.61	426		
1 3 11	SU11 Floor#10	1.0	60.9 27.5	127.0 19.2	144.79	148.66	386		
1 3 12	SU11 Floor#11	1.0	34.5 38.3	146.4 17.7	45.43	176.95	413		
1 7 13	SU11 Floor#12	1.0	38.0 36.1	56.9 31.2	93.32	64.62	416		
1 7 14	SU11 Floor#13	1.0	58.1 28.2	72.8 26.7	143.92	81.16	430		
1 7 15	SU11 Floor#14	1.0	27.3 44.2	41.8 38.1	70.45	47.68	393		
1 7 16	SU11 Floor#15	1.0	17.2 59.7	32.7 45.1	39.51	38.00	412		
1 7 17	SU11 Floor#16	1.0	39.3 35.4	68.6 27.7	91.36	79.06	420		
1 7 18	SU11 Floor#17	1.0	17.5 59.0	21.4 61.4	45.05	23.83	414		
1 7 19	SU11 Floor#18	1.0	4.6 160	10.3 110	11.67	12.16	354		
1 7 20	SU11 Floor#19	1.0	16.0 62.5	28.9 49.3	36.01	33.35	432		
1 7 21	SU11 Floor#20	1.0	16.3 61.8	37.6 41.0	33.52	44.17	428		
1 7 22	SU11 Floor#21	1.0	11.4 79.4	45.5 36.1	15.74	54.80	427		
1 7 23	SU11 Floor#22	1.0	6.7 118	24.2 56.1	10.13	28.96	442		
1 7 24	SU11 Floor#23	1.0	15.4 64.4	19.5 65.8	37.35	21.84	440		
1 10 25	SU11 Floor#24	1.0	19.6 54.6	21.3 61.7	50.70	23.28	423		
1 10 26	SU11 Floor#25	1.0	5.7 134	16.2 76.3	10.38	19.17	442		
1 10 27	SU11 Floor#26	1.0	10.5 84.2	11.4 101	26.42	12.48	438		
1 10 28	SU11 Floor#27	1.0	5.6 137	4.3 239	14.73	4.43	443		
1 10 29	SU11 Floor#28	1.0	36.6 37.0	19.3 66.4	100.46	18.17	435		
1 10 30	SU11 Floor#29	1.0	17.4 59.1	17.5 71.7	44.63	18.95	433		
1 10 31	SU11 Floor#30	1.0	16.2 62.1	7.7 141	45.79	6.93	424		
1 10 32	SU11 Floor#31	1.0	11.7 77.7	19.2 66.8	27.15	21.95	433		
1 10 33	SU11 Floor#32	1.0	18.5 56.8	34.6 43.4	44.21	40.14	400		
1 10 34	SU11 Floor#33	1.0	8.8 96.2	51.1 33.4	6.01	62.34	405		
1 10 35	SU11 Floor#34	1.0	3.8 187	31.1 46.8	0.00	38.14	405		
1 10 36	SU11 Floor#35	1.0	28.1 43.4	29.8 48.3	79.19	32.45	389		
1 16 37	SU11 Floor#36	1.0	40.6 34.7	46.3 35.6	109.93	51.01	399		

29 Oct 2009 11:46	ALPHA/BETA - 1.09	Page #2
Protocol #: 1	Smears H-3 & C-14	User : EaglePicher / ES

P#PID S#	SMPL_ID	TIME	CPMAA:25%	CPMBB:25%	3H-DPM	14C-DPM	tSIE	FLAG
1 16 38	SU11 Floor#37	1.0	24.8 47.0	33.1 44.8	66.85	37.21	388	
1 16 39	SU11 Floor#38	1.0	18.9 56.0	22.0 60.1	53.01	24.35	383	
1 16 40	SU11 Floor#39	1.0	14.4 67.5	27.5 51.0	35.63	32.07	381	
1 16 41	SU11 Floor#40	1.0	22.7 49.6	23.2 57.9	68.42	25.12	365	
1 16 42	SU11 Floor#41	1.0	15.5 63.9	25.4 54.1	36.78	29.09	420	

4.3.12 SU012-West Hallway

The West Hallway floor had some areas in excess of limits (60,000 dpm/100 cm²). The remaining linoleum was removed and the floor cleaned. One small area on the floor still exceeded limits. The West Hallway floor was changed to a Class 1 area and resurveyed. In addition the painted block walls were also contaminated from the floor up to the ceiling. The walls and a part of the floor were removed as radioactive waste and not included in the Final Status Survey (FSS).

Summary results are provided in Table 4-15 which is followed by the survey package, a survey map, survey data sheets, charts presenting the survey data, instrument download reports and the smear results from the Packard Tri-Carb Liquid Scintillation counter.

Table 4-15: SU012 Summary Results

Summary Survey Unit 012 West Hallway, Class 1	Beta	Beta Scan Maximums (dpm/100cm ²)	H-3 Smear (dpm/100cm ²)	C-14 Smear (dpm/100cm ²)
	Fixed Reading (dpm/100cm ²)			
Number	18	2	18	18
Average	5,163	18,204	13.3	12.5
Standard Deviation	4,181	N/A	20.9	14.9
Maximum	15,645	20,764	62.5	46.5

*Beta scan maximum results include maximum data from fixed readings.



FSS Survey Package Worksheet for
EaglePicher SU012

Package Identification No.: SU12F/SU12S	Prepared by: Paul C. Ely
Location: West Hallway	Date Prepared: 10/28/2009
Area Classification: Class 1	Signature: <i>Paul Ely</i>

Area Description

The survey area includes the floors only.

Historical Information

Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3.

General Survey Instructions

1. Use gas proportional detector model numbers 43-68, or equivalent detector as approved by the ES PM for beta surface activity surveys. The total instrument efficiency should use the following factors:
 - ϵ_i , 2π instrument efficiency from calibration papers. If a 4π efficiency is reported, calculate the 2π efficiency as follows using a 5% beta Back Scatter factor (BS). $\epsilon_i = (2 * \epsilon_{4\pi}) \backslash (1 + BS)$
 - ϵ_s , the beta surface efficiency is 25%.
 - ϵ_t , the total beta efficiency = $\epsilon_i * \epsilon_s$
2. Perform surface scans at a scan speed of 1 probe width per second or less for the 43-68. Any locations that exceed 2,500 cpm beta above background should be marked with a felt tip pen or equivalent and the extent of the elevated area recorded.
 - 100% scan of floor for beta contamination.
3. Perform direct beta surface activity measurements at each measurement location. Mark the survey locations with a felt tip pen or equivalent. All surveys locations are referenced from the southwest corner of the survey unit. Systematic survey locations were generated for this class 1 survey unit.
4. Collect a removable surface activity sample (smear) over an area of 100 cm² in size at each measurement location provided on survey maps and place the smear in a liquid scintillation vial immediately after it was taken.

Special Instructions

- | | |
|--|--|
| <ul style="list-style-type: none"> • Source check instrumentation to C-14 for beta measurements. • The static MDC for total beta activity measurements shall be less than 3,000 dpm/100 cm². • Perform a minimum of three one-minute field backgrounds using the plastic shield on the survey surface. • Log scan measurements or record maximum scan measurement results in cpm on a Grid Scan Record. | <ul style="list-style-type: none"> • Measurement and sampling locations are based on a random-start rectangular pattern. If any location is inaccessible, offset the measurement location to the nearest usable location and document the x and y coordinates for the location used. • The attached map provides floor measurement and sampling locations. |
|--|--|

Survey Performance (Initial and date as each item is completed)

[illegible]

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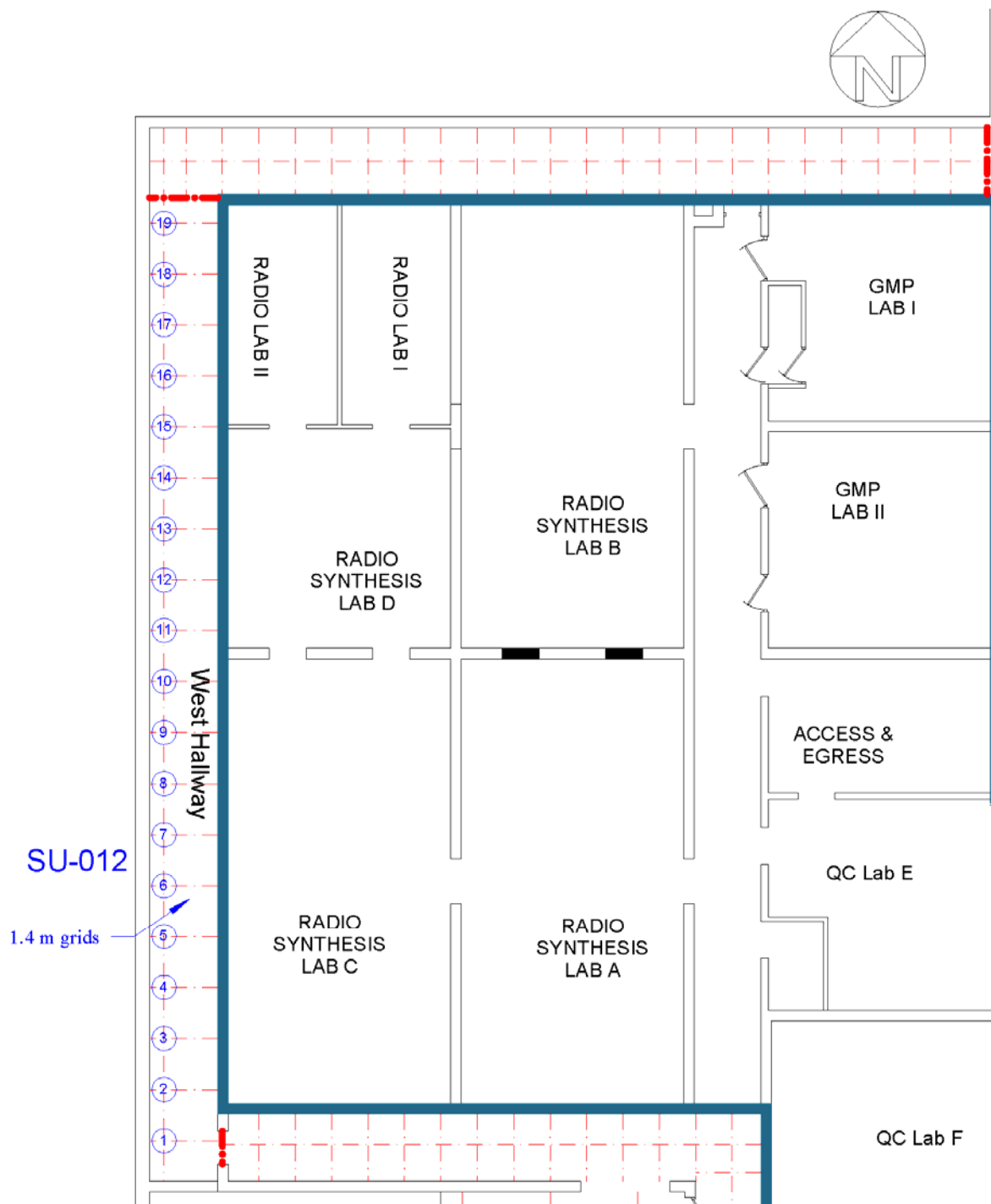


Figure 4-13 SU012 Survey Map

**Final Status Survey Report
for EaglePicher, Lenexa, Kansas**

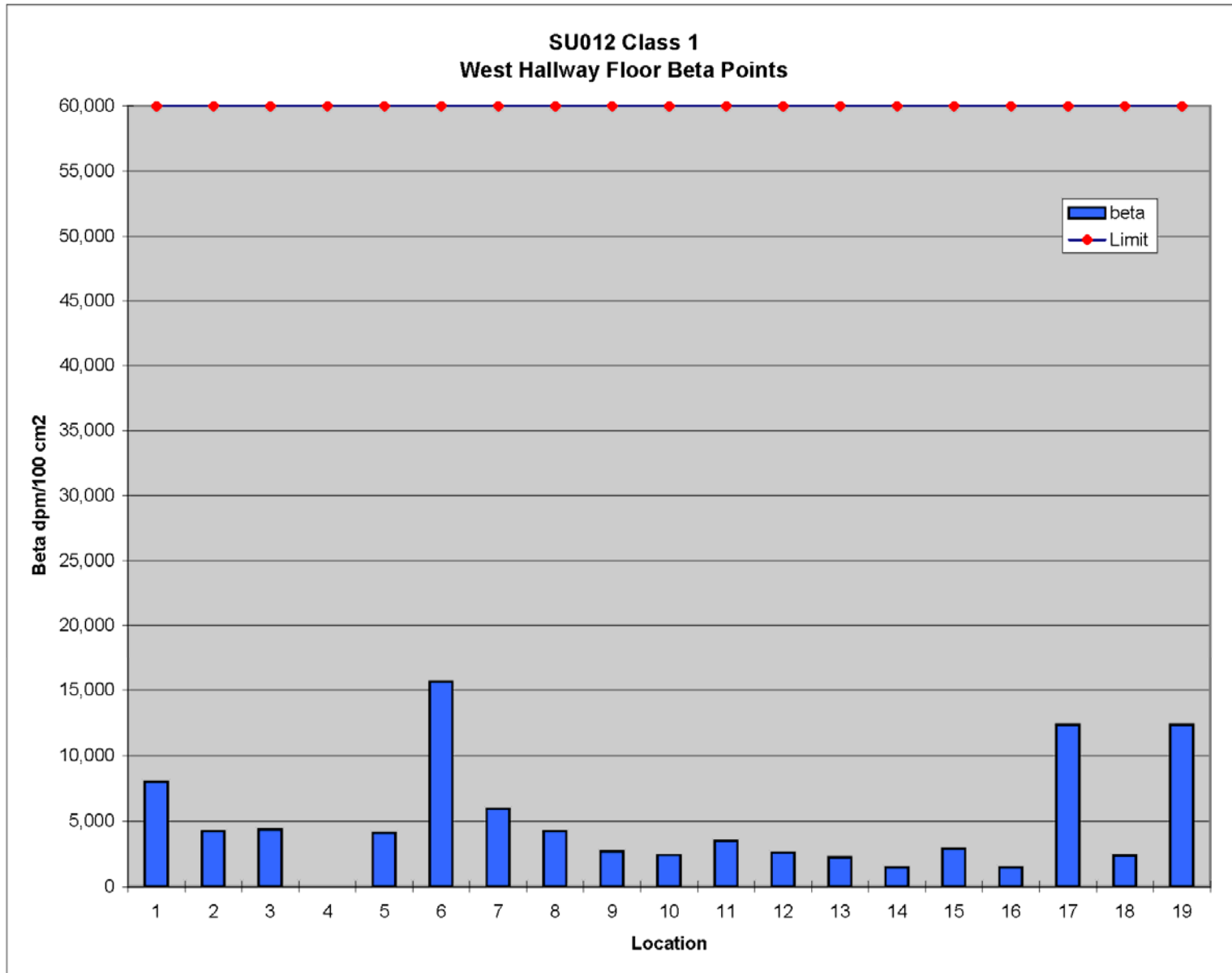
**CS-HP-PN-018
Revision 1**

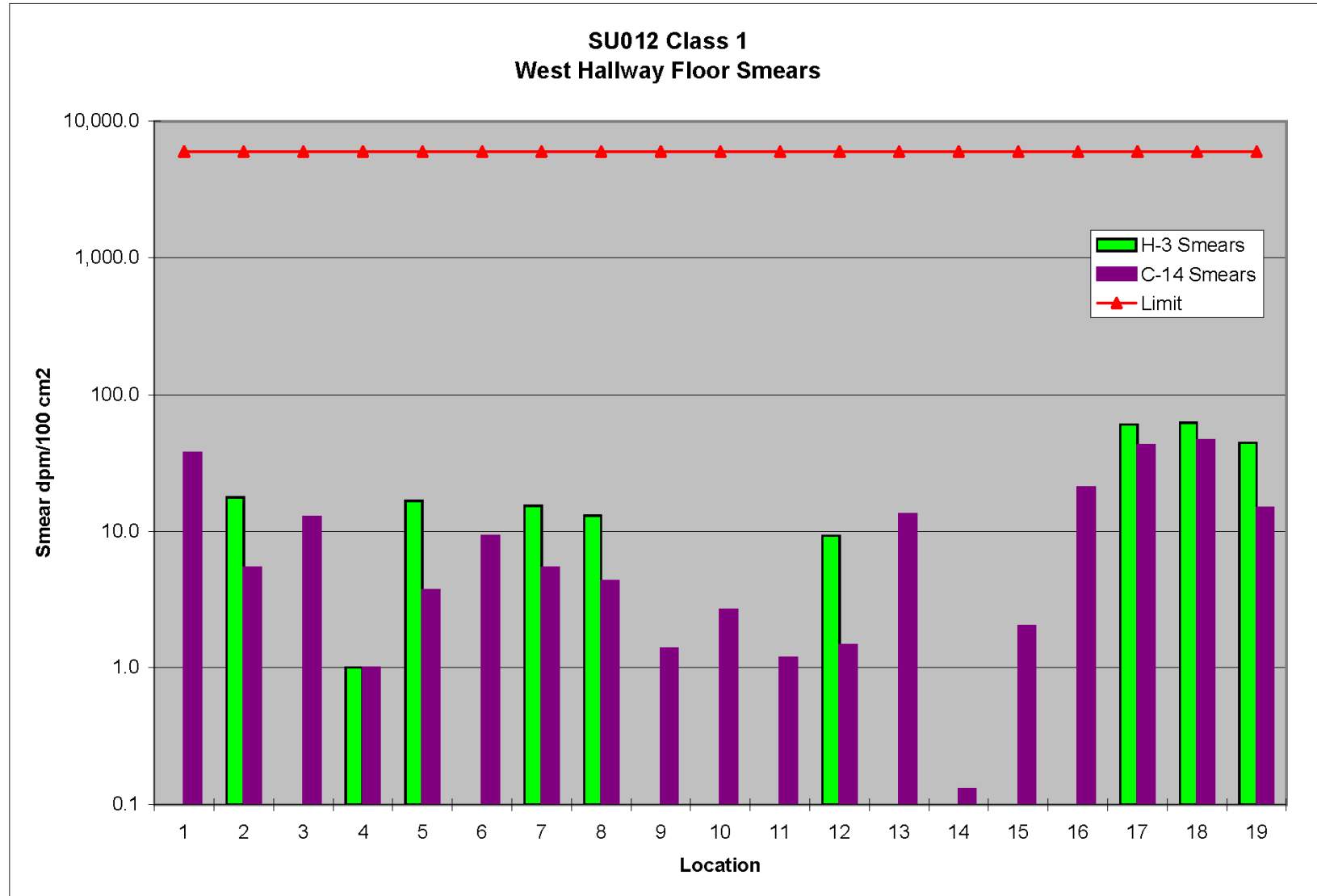
EaglePicher FSS Data Sheet
Survey Unit 012
West Hallway

Detector Type	Detector SN	Detector	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Ludlum 43-68 (beta)	119337	(cm ²)	9/30/10	2350-1	95359	9/30/10
Packard Tri-Carb B2555	401663	NA	Daily	NA	NA	NA

Survey			Beta		H-3		C-14
			Fixed Reading	Limit	Smear	Limit	Smear
Point	Loc.*		(dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)	(dpm/100cm ²)
1	F	Floor	7,996	60,000	0.0	6,000	37.5
2	F	Floor	4,239	60,000	17.7	6,000	5.4
3	F	Floor	4,349	60,000	0.0	6,000	12.8
4	F	Floor	To Radwaste	60,000	To Radwaste	6,000	To Radwaste
5	F	Floor	4,104	60,000	16.8	6,000	3.7
6	F	Floor	15,645	60,000	0.0	6,000	9.3
7	F	Floor	5,957	60,000	15.4	6,000	5.4
8	F	Floor	4,231	60,000	13.0	6,000	4.3
9	F	Floor	2,682	60,000	0.0	6,000	1.4
10	F	Floor	2,411	60,000	0.0	6,000	2.6
11	F	Floor	3,511	60,000	0.0	6,000	1.2
12	F	Floor	2,614	60,000	9.3	6,000	1.5
13	F	Floor	2,225	60,000	0.0	6,000	13.3
14	F	Floor	1,489	60,000	0.0	6,000	0.1
15	F	Floor	2,877	60,000	0.0	6,000	2.0
16	F	Floor	1,481	60,000	0.0	6,000	20.9
17	F	Floor	12,362	60,000	60.4	6,000	42.7
18	F	Floor	2,394	60,000	62.5	6,000	46.5
19	F	Floor	12,362	60,000	44.4	6,000	14.8
Average	F	Floor	5,163		13.3		12.5
Standard Deviation	F	Floor	4,181		20.9		14.9
Maximum	F	Floor	15,645		62.5		46.5

* R = Roof, F = Floor, W = Wall, C = Ceiling, E = Equipment







M2350-1 Download BETA Report

File Name : 0000039		Survey Description : SU12 Points on floor 1-18	
Survey Reason : Final Status			
User ID : RPS2366		Technician Name : Richard Stoney	
Instrument Model : 2350-1	Instrument S/N : 95359	Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b	Detector S/N : 119337	Detector Cal. Due : 9/30/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm2 Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0938	Survey Date : 10/28/2009	
Minimum Net DPM Observed : -1593	Mean Net DPM : 19271		
Maximum Net DPM Observed : 261059	STDEV Observed : 53209	# of Samples Taken : 25	

Richard Stoney
Print Name

Signature

Date

Print Name

Signature

Date

Comments:

Area around point #4 on floor will be shipped off site as radioactive waste. Area marked with orange paint. PEE, 10/30/09
All scan results < 3,000 cpm. This is equivalent to 20,764 dpm/100cm². $3,000 - 546 \text{ cpm (background)} = 2,454 \text{ cpm}$
 $2,454 \text{ cpm} \div 0.0938 \text{ cpm/dpm (Efficiency)} \div 126 \text{ cm}^2 \times 100 \text{ cm}^2 = 20,764 \text{ dpm/100 cm}^2$. PEE

Sign-Off

Paul Ely
Print Name

Signature

Date

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000039

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU12	FL01	0	542.0	60	FLDBK	B0002	ZZZZZ	0	546	-34
SU12	FL01	1	1,491.0	60	FLDCT	B0002	ZZZZZ	1	546	7,996
SU12	FL01	2	1,047.0	60	FLDCT	B0002	ZZZZZ	2	546	4,239
SU12	FL01	3	1,060.0	60	FLDCT	B0002	ZZZZZ	3	546	4,349
SU12	FL01	4	31,400.0	60	FLDCT	B0002	ZZZZZ	4	546	261,059
SU12	FL01	5	1,031.0	60	FLDCT	B0002	ZZZZZ	5	546	4,104
SU12	FL01	6	2,395.0	60	FLDCT	B0002	ZZZZZ	6	546	15,645
SU12	FL01	7	1,250.0	60	FLDCT	B0002	ZZZZZ	7	546	5,957
SU12	FL01	8	1,046.0	60	FLDCT	B0002	ZZZZZ	8	546	4,231
SU12	FL01	9	863.0	60	FLDCT	B0002	ZZZZZ	9	546	2,682
SU12	FL01	10	831.0	60	FLDCT	B0002	ZZZZZ	10	546	2,411
SU12	FL01	11	961.0	60	FLDCT	B0002	ZZZZZ	11	546	3,511
SU12	FL01	12	855.0	60	FLDCT	B0002	ZZZZZ	12	546	2,614
SU12	FL01	13	809.0	60	FLDCT	B0002	ZZZZZ	13	546	2,225
SU12	FL01	14	722.0	60	FLDCT	B0002	ZZZZZ	14	546	1,489
SU12	FL01	15	686.0	60	FLDCT	B0002	ZZZZZ	15	546	2,877
SU12	FL01	16	721.0	60	FLDCT	B0002	ZZZZZ	16	546	1,481
SU12	FL01	17	3,943.0	60	FLDCT	B0002	ZZZZZ	17	546	28,742
SU12	FL01	18	829.0	60	FLDCT	B0002	ZZZZZ	18	546	2,394
SU12	FL01	19	2,007.0	60	FLDCT	B0002	ZZZZZ	19	546	12,362
SU12	FL01	20	541.0	60	FLDBK	B0002	ZZZZZ	20	546	-42
SU12	FL01	21	10,172.0	60	FLDCT	B0002	ZZZZZ	21	546	81,447
SU12	FL01	22	555.0	60	FLDBK	B0002	ZZZZZ	22	546	76
SU12	FL01	23	3,577.0	600	PTBBK	B0002	ZZZZZ	23	546	-1,593
SU12	FL01	24	4,275.0	60	PTSC1	B0002	ZZZZZ	24	546	31,551

Decoy

Decoy

recount after
decid

recount after
decid

in this area
hit
to rad waste

REC 11/3/09

Beta Flag

45000 -

Beta Max Flag

60000

Wednesday, October 28, 2009

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Final Status Survey Report
for EaglePicher, Lenexa, Kansas

CS-HP-PN-018
Revision 1

02 Nov 2009 10:24 ALPHA/BETA - 1.09 Page #1
 Protocol #: 1 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
 Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
 Low Energy: 3H
 High Energy: 14C
 Background Subtract: 1st Vial

	LL	UL	LCR	25%	BKG
Region A:	0.0 - 12.0		0	0.0	13.11
Region B:	12.0 - 156		0	0.0	18.89
Region C:	0.0 - 0.0		0	0.0	0.00

SU012

Quench Indicator: tSIE/AEC
 Ext Std Terminator: Count
 FSS Smears in 20 ml Ultima Gold
 Coincidence Time(ns): 18
 Delay Before Burst(ns): Normal
 Protocol Data Filename: C:\EP\PROT.DAT
 Count Data Filename: C:\EP\SDATA1.001

P#	PID	S#	SMPL_ID	TIME	CPMAA:25%	CPMBB:25%	3H-DPM	14C-DPM	tSIE	FLAG
1	2	1		10.0	13.1 17.5	18.9 14.6	0.00	0.00	429	B
1	2	2	SU012 Floor_1	1.0	0.0 0.0	30.1 47.4	0.00	37.46	435	
1	2	3	SU012 Floor_2	1.0	6.8 136	5.2 195	17.72	5.43	443	
1	2	4	SU012 Floor_3	1.0	0.0 0.0	10.3 109	0.00	12.75	441	
1	2	5	SU012 Floor_4	1.0	2.4 338	6.6 159	4.48	7.79	443	
1	2	6	SU012 Floor_5	1.0	6.2 146	3.8 261	16.75	3.73	438	
1	2	7	SU012 Floor_6	1.0	0.0 0.0	7.5 143	0.00	9.26	446	
1	2	8	SU012 Floor_7	1.0	5.9 153	5.1 199	15.35	5.41	437	
1	2	9	SU012 Floor_8	1.0	4.9 180	4.1 243	13.04	4.32	426	
1	2	10	SU012 Floor_9	1.0	0.0 0.0	1.1 845	0.00	1.38	433	
1	2	11	SU012 Floor_10	1.0	0.0 0.0	2.1 454	0.00	2.62	440	
1	2	12	SU012 Floor_11	1.0	0.0 ****	1.0 977	0.00	1.18	410	
1	3	13	SU012 Floor_12	1.0	3.4 249	1.6 588	9.31	1.46	441	
1	3	14	SU012 Floor_13	1.0	0.0 0.0	10.7 105	0.00	13.30	439	
1	3	15	SU012 Floor_14	1.0	0.0 0.0	0.1 8521	0.00	0.13	427	
1	3	16	SU012 Floor_15	1.0	0.0 0.0	1.6 591	0.00	2.00	426	
1	3	17	SU012 Floor_16	1.0	1.1 719	16.9 72.6	0.00	20.87	430	
1	3	18	SU012 Floor_17	1.0	22.0 54.8	37.0 41.1	60.41	42.72	359	
1	3	19	SU012 Floor_18	1.0	22.8 53.4	40.2 38.9	62.52	46.59	356	
1	3	20	SU012 Floor_19	1.0	0.0 0.0	4.1 245	44.41	14.82	13.2	E

4.3.13 SU013-Mezzanine Walls

This area was not initially part of a survey unit and before generating a survey package the walls were scanned for beta activity. The Mezzanine walls had uniform elevated activity, but less than the release limit. An initial scan revealed uniform activity from the bare concrete blocks, but the activity was not elevated on drywall, steel beams, ducts, and horizontal surfaces in the area. This is not a normal airborne contamination scenario as it did not result from contaminated dust or fume deposition because it only affected the bare concrete block.

Bare concrete block in the receiving area at the south east corner of the building was surveyed to see if had elevated activity levels. This block was well away from radioactive material work areas and the activity was only slightly elevated. The average activity on the bare block in the receiving area was 805 cpm/126 cm² as compared to the normal instrument background activity of approximately 400 cpm/126 cm². The bare block background count rate was used for the mezzanine wall activity calculations.

A radon assessment was also performed on the mezzanine bare block. This was performed by surveying a small block area, covering the block with plastic overnight (to allow radon decay and to prevent recontamination) and resurveying the block. There was no reduction in the measured activity so radon was not the problem.

The source of the elevated activity was not determined, but the mezzanine wall block did not exceed release limits so no further investigation was performed. The mezzanine walls were then surveyed as a Class 2 survey unit.

Summary results are provided in Table 4-16 which is followed by the survey package, a survey map, survey data sheets, charts presenting the survey data, instrument download reports and the smear results from the Packard Tri-Carb Liquid Scintillation counter.

Table 4-16: SU013 Summary Results

Summary Survey Unit 013 Mezzanine Walls, Class 2	Beta	Beta Scan Maximums (dpm/100cm ²)	H-3 Smear (dpm/100cm ²)	C-14 Smear (dpm/100cm ²)
	Fixed Reading (dpm/100cm ²)			
Number	30	2	30	30
Average	19,252	40,043	21.9	32.9
Standard Deviation	12,374	N/A	23.6	21.5
Maximum	35,566	44,521	114.8	96.5

*Beta scan maximum results include maximum data from fixed readings.



FSS Survey Package Worksheet for
EaglePicher SU013

Package Identification No.: SU13F/SU13S	Prepared by: Paul C. Ely
Location: Mezzanine Walls	Date Prepared: 10/30/2009
Area Classification: Class 2	Signature: <i>Paul Ely</i>

Area Description
The survey area includes the walls only.

Historical Information
Since May 13, 1985, this facility has been performing custom synthesis of tritium and C-14 radio-labeled organic compounds at the EaglePicher site. The isotopes of concern are C-14 and H-3.

General Survey Instructions
<ol style="list-style-type: none"> Use gas proportional detector model numbers 43-68, or equivalent detector as approved by the ES PM for beta surface activity surveys. The total instrument efficiency should use the following factors: <ul style="list-style-type: none"> ϵ_i, 2π instrument efficiency from calibration papers. If a 4π efficiency is reported, calculate the 2π efficiency as follows using a 5% beta Back Scatter factor (BS). $\epsilon_i = (2 * \epsilon_{4\pi}) \backslash (1 + BS)$ ϵ_s, the beta surface efficiency is 25%. ϵ_t, the total beta efficiency = $\epsilon_i * \epsilon_s$ Perform surface scans at a scan speed of 1 probe width per second or less for the 43-68. Any locations that exceed 4,000 cpm beta above background should be marked with a felt tip pen or equivalent and the extent of the elevated area recorded. <ul style="list-style-type: none"> 25% scan of walls for beta contamination. Perform direct beta surface activity measurements at each measurement location. Mark the survey locations with a felt tip pen or equivalent. All surveys locations are referenced from the southwest corner of the survey unit. Systematic survey locations were generated for this class 1 survey unit. Collect a removable surface activity sample (smear) over an area of 100 cm² in size at each measurement location provided on survey maps and place the smear in a liquid scintillation vial immediately after it was taken.

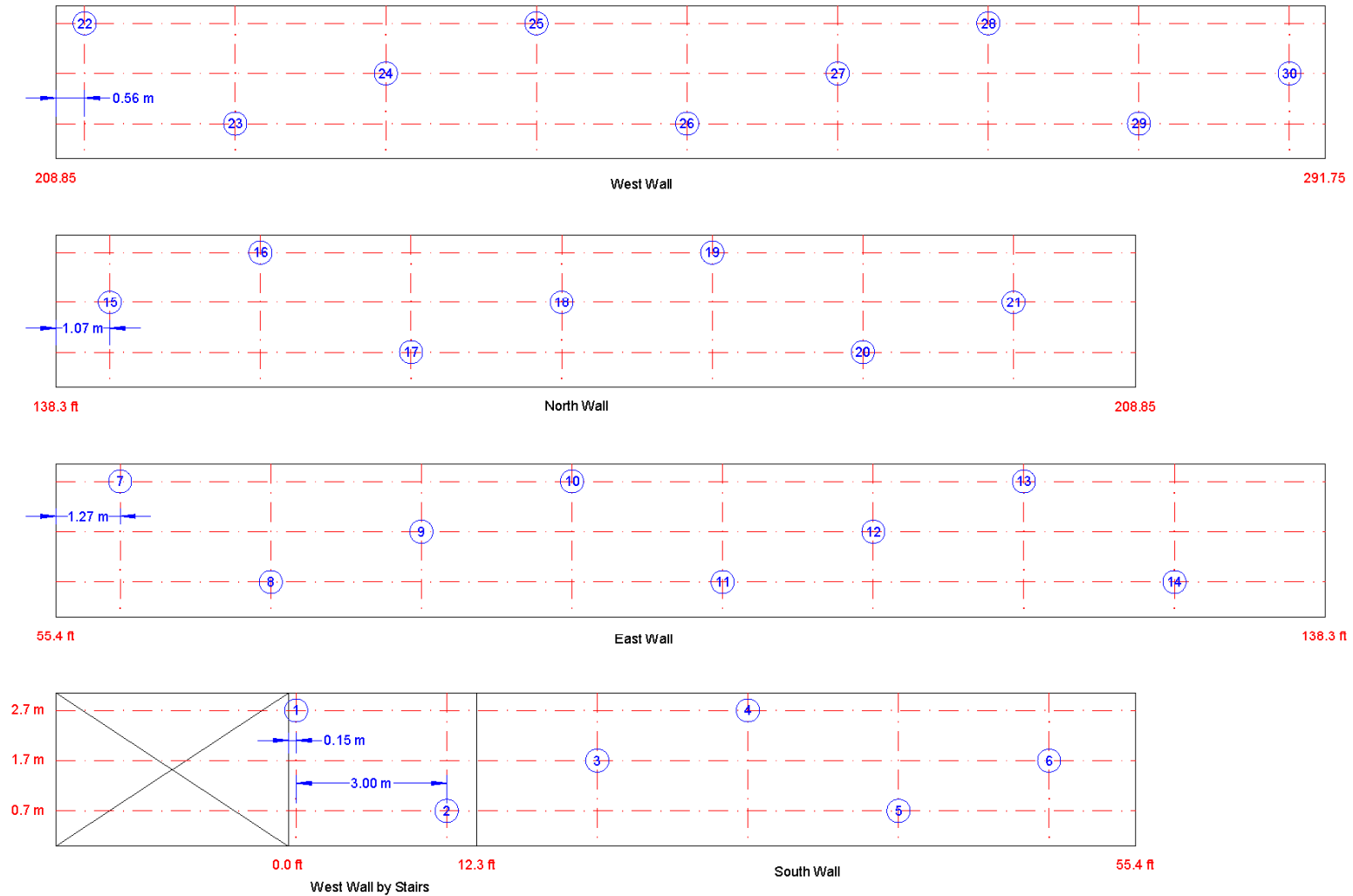
Special Instructions

- | | |
|---|---|
| <ul style="list-style-type: none"> • Source check instrumentation to C-14 for beta measurements. • The static MDC for total beta activity measurements shall be less than 3,000 dpm/100 cm². • Perform a minimum of three one-minute field backgrounds using the plastic shield on the survey surface. A material specific background of 804 cpm/100cm² will be used for concrete block walls. • Log scan measurements or record maximum scan measurement results in cpm on a Grid Scan Record. | <ul style="list-style-type: none"> • Measurement and sampling locations are based on a random-start rectangular pattern. If any location is inaccessable, offset the measurement location to the nearest usable location and document the x and y coordinates for the location used. • The attached map provides wall measurement and sampling locations. |
|---|---|

Survey Performance (Initial and date as each item is completed)

[illegible]

Rev. 0



Mezzanine Walls SU-013

Figure 4-14 SU013 Survey Map

Final Status Survey Report for EaglePicher, Lenexa, Kansas

CS-HP-PN-018
Revision 1

EaglePicher FSS Data Sheet

Survey Unit 013

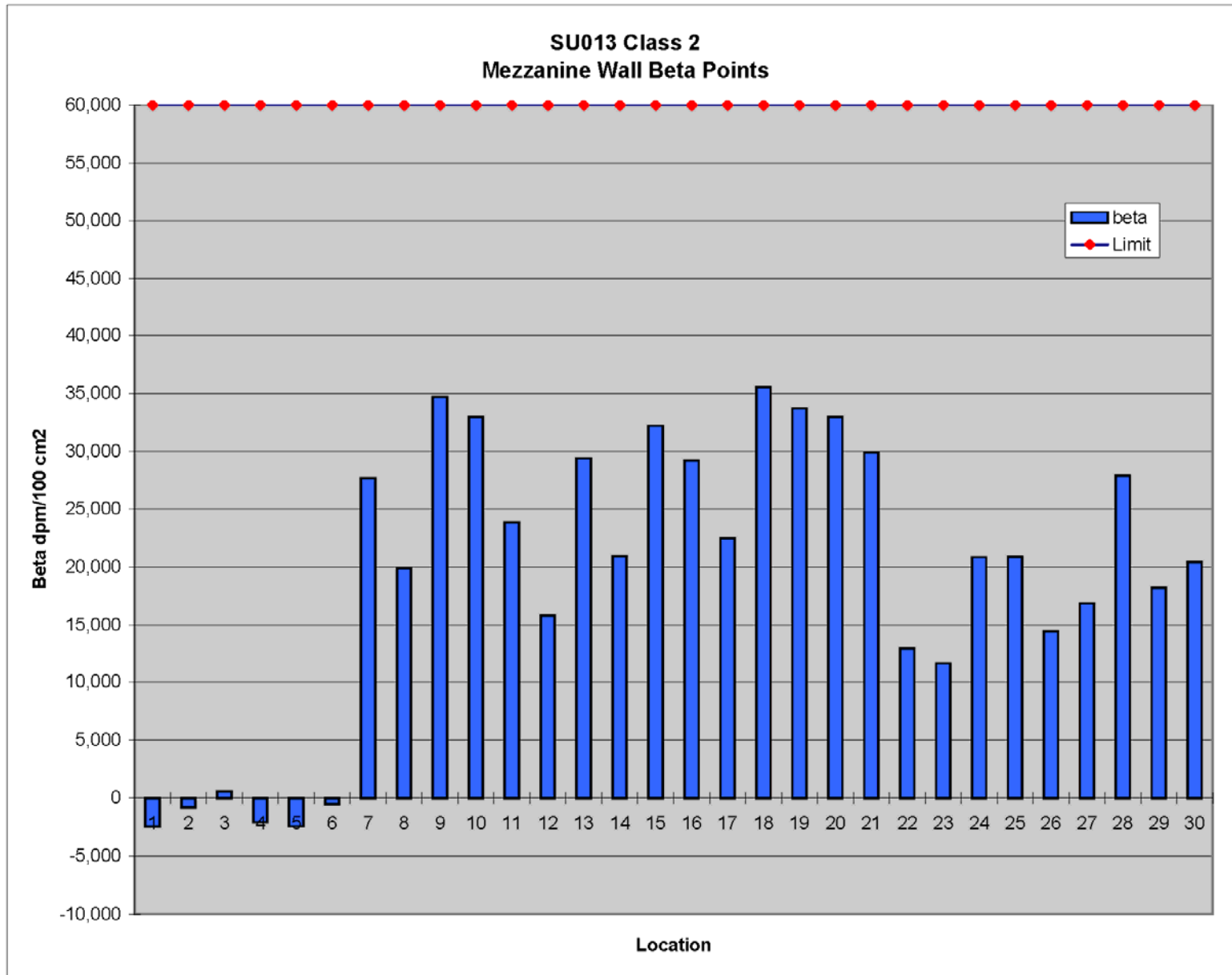
Mezzanine Walls

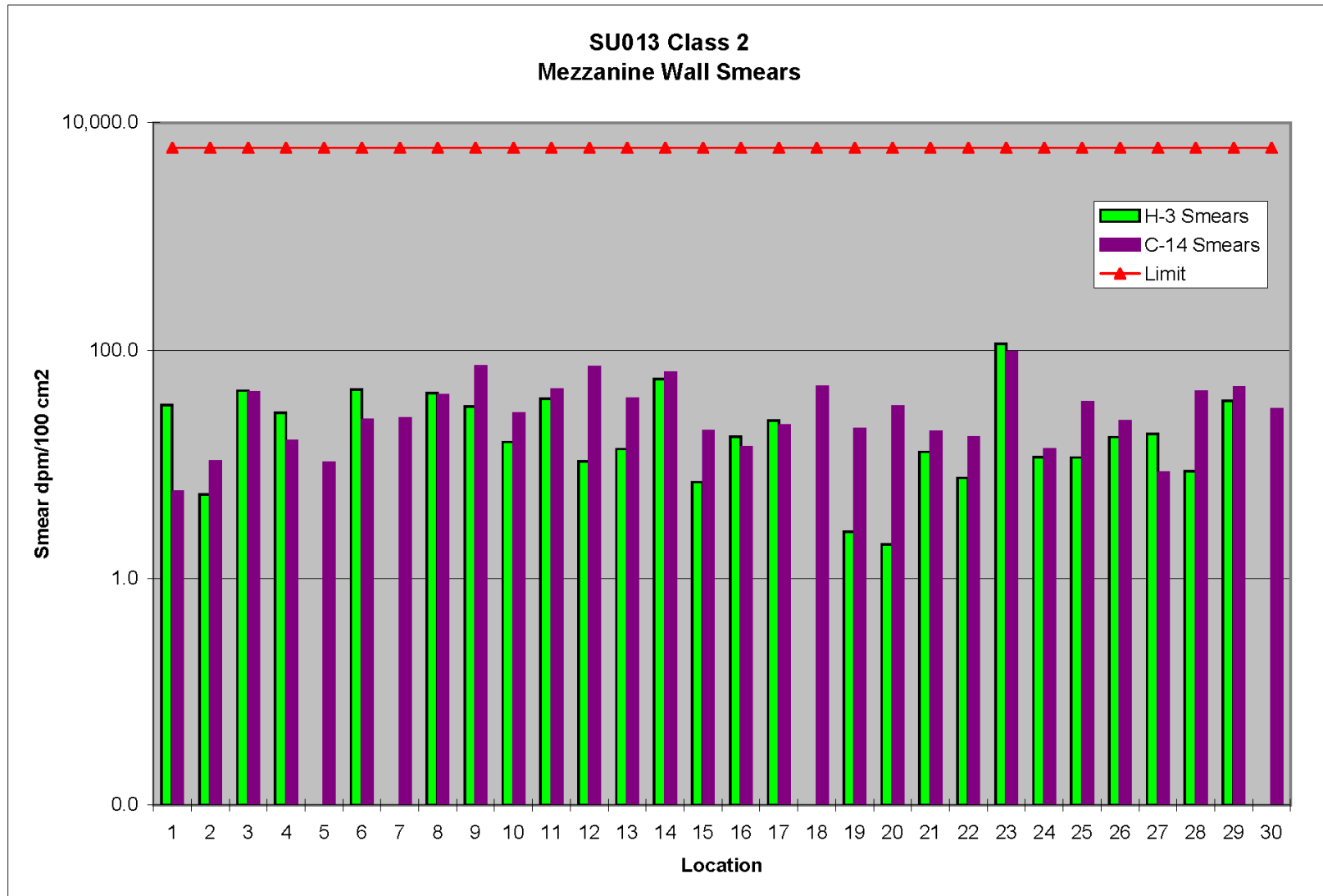
Background on Block: 4,496 dpm/100 cm² 804.8 cpm/126 cm²

Detector		Detector SN	(cm ²)	Detector Cal Due	Meter Type	Meter SN	Meter Cal Due
Detector Type	Ludlum 43-68 (beta)	091028	126	9/28/10	2350-1	117566	9/28/10
	Ludlum 43-68 (beta)	119337	126	9/30/10	2350-1	95359	9/30/10
	Packard Tri-Carb B2555	401663	NA	Daily	NA	NA	NA

Survey Point	Loc.*		Beta		H-3		C-14
			Fixed Reading (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)	Limit (dpm/100cm ²)	Smear (dpm/100cm ²)
1	W	Wall	-2,471	60,000	33.3	6,000	5.7
2	W	Wall	-795	60,000	5.4	6,000	10.7
3	W	Wall	550	60,000	44.3	6,000	42.9
4	W	Wall	-2,090	60,000	28.5	6,000	16.0
5	W	Wall	-2,428	60,000	0.0	6,000	10.4
6	W	Wall	-508	60,000	45.2	6,000	24.5
7	W	Wall	27,661	60,000	0.0	6,000	25.5
8	W	Wall	19,905	60,000	42.4	6,000	40.7
9	W	Wall	34,674	60,000	32.2	6,000	73.1
10	W	Wall	32,987	60,000	15.7	6,000	27.9
11	W	Wall	23,831	60,000	37.9	6,000	45.7
12	W	Wall	15,799	60,000	10.7	6,000	71.2
13	W	Wall	29,412	60,000	13.6	6,000	37.5
14	W	Wall	20,924	60,000	56.3	6,000	63.7
15	W	Wall	32,202	60,000	7.0	6,000	19.7
16	W	Wall	29,231	60,000	17.5	6,000	14.1
17	W	Wall	22,462	60,000	24.3	6,000	22.1
18	W	Wall	35,566	60,000	0.0	6,000	48.3
19	W	Wall	33,698	60,000	2.6	6,000	20.5
20	W	Wall	32,997	60,000	2.0	6,000	32.5
21	W	Wall	29,889	60,000	12.9	6,000	19.4
22	W	Wall	12,937	60,000	7.6	6,000	17.3
23	W	Wall	11,600	60,000	114.8	6,000	96.5
24	W	Wall	20,857	60,000	11.6	6,000	13.5
25	W	Wall	20,890	60,000	11.5	6,000	35.0
26	W	Wall	14,426	60,000	17.3	6,000	23.9
27	W	Wall	16,863	60,000	18.4	6,000	8.4
28	W	Wall	27,888	60,000	8.7	6,000	43.7
29	W	Wall	18,200	60,000	36.2	6,000	47.5
30	W	Wall	20,417	60,000	0.0	6,000	30.3
Average	F	Floor	19,252		21.9		32.9
Standard Deviation	F	Floor	12,374		23.6		21.5
Maximum	F	Floor	35,566		114.8		96.5

* R = Roof, F = Floor, W = Wall, C = Ceiling, E = Equipment







M2350-1 Download BETA Report

File Name : 00000044		Survey Description : In Receiving Area	
Survey Reason : Other (explain) Background Study			
User ID : SXM1098		Technician Name : Sharon McChesney	
Instrument Model : 2350-1	Instrument S/N : 80502	Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b	Detector S/N : 095523	Detector Cal. Due : 9/30/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm ² Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0681	Survey Date : 10/29/2009	
Minimum Net DPM Observed : 315	Mean Net DPM: 3390		
Maximum Net DPM Observed: 6223	STDEV Observed: 2135	# of Samples Taken: 14	

Sharon McChesney
Print Name

Sharon McChesney
Signature

10-29-09
Date

Print Name

Signature

Date

Comments:

Source check and background for port core
on Survey # 00000042 download.
Material specific background data for bare
concrete block taken in receiving area entry.

Sign-Off

Paul Ely
Print Name

Paul Ely
Signature

10/30/09
Date

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000044

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
ZZZZZ	ZZZZZ	0	634.0	60	BSTDY	B9999	ZZZZZ	4	419	2,506
ZZZZZ	ZZZZZ	2	651.0	60	BSTDY	B9999	ZZZZZ	1	419	2,704
ZZZZZ	ZZZZZ	3	658.0	60	BSTDY	B9999	ZZZZZ	2	419	2,785
ZZZZZ	ZZZZZ	4	894.0	60	BSTDY	B9999	ZZZZZ	3	419	5,536
ZZZZZ	ZZZZZ	5	850.0	60	BSTDY	B9999	ZZZZZ	4	419	5,023
ZZZZZ	ZZZZZ	6	778.0	60	BSTDY	B9999	ZZZZZ	5	419	4,184
ZZZZZ	ZZZZZ	7	804.0	60	BSTDY	B9999	ZZZZZ	6	419	4,487
ZZZZZ	ZZZZZ	8	781.0	60	BSTDY	B9999	ZZZZZ	7	419	3,986
ZZZZZ	ZZZZZ	9	831.0	60	BSTDY	B9999	ZZZZZ	8	419	4,802
ZZZZZ	ZZZZZ	10	868.0	60	BSTDY	B9999	ZZZZZ	9	419	5,223
ZZZZZ	ZZZZZ	11	953.0	60	BSTDY	B9999	ZZZZZ	10	419	6,223

Beta Flag	45000	-	<input type="text"/>
Beta Max Flag	60000		<input type="text"/>

Thursday, October 29, 2009

Page 2 of 2



M2350-1 Download BETA Report

File Name : 00000046		Survey Description : SU13F Walls Points 7-21	
Survey Reason : Final Status			
User ID : RLS2098		Technician Name : Lee Severtson	
Instrument Model : 2350-1	Instrument S/N : 117566	Instrument Cal. Due : 9/28/2010	
Detector Model : 43-68b	Detector S/N : 091028	Detector Cal. Due : 9/28/2010	
Measurement Type : BETA	Detector Type : 02200 : 126 cm ² Gas Proportional Detector		
Detector Area : 126	Efficiency : 0.0748	Survey Date : 10/30/2009	
Minimum Net DPM Observed: 3455	Mean Net DPM: 26754		
Maximum Net DPM Observed: 45614	STDEV Observed: 11239	# of Samples Taken: 20	

Lee Severtson
Print Name

Lee Severtson
Signature

10-30-09
Date

Print Name

Signature

Date

Comments:

Material specific background used. A concrete block background from unpainted block in receiving area entryway was utilized (804 cpm/126cm²)

no scan readings > 5000 cpm found
This is equivalent to 44,521 dpm/100 cm². 5000 cpm = 804 cpm (Bg)
= 4196 cpm. 4196 cpm ÷ 0.0748 cpm/dpm (Efficiency) ÷ 126 cm²
x 100 cm² = 44,521 dpm/100 cm² PRC

Sign-Off

Paul Ely
Print Name

Paul Ely
Signature

10/30/09
Date

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000046

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
ZZZZZ	ZZZZZ	0	3,266.0	600	PRBBK	B9999	ZZZZZ	1	0	3,465
ZZZZZ	ZZZZZ	1	1,582.0	60	PRBBK	B9999	ZZZZZ	2	0	16,786
ZZZZZ	ZZZZZ	2	4,299.0	60	PRBBK	B9999	ZZZZZ	3	0	45,614
SU13F	W01	3	2,778.0	60	FLDCT	B0005	ZZZZZ	14	804	20,924
SU13F	W01	4	3,576.0	60	FLDCT	B0005	ZZZZZ	13	804	29,412
SU13F	W01	5	2,293.0	60	FLDCT	B0005	ZZZZZ	12	804	15,799
SU13F	W01	6	3,050.0	60	FLDCT	B0005	ZZZZZ	11	804	23,831
SU13F	W01	7	3,913.0	60	FLDCT	B0005	ZZZZZ	10	804	32,987
SU13F	W01	8	4,072.0	60	FLDCT	B0005	ZZZZZ	9	804	34,674
SU13F	W01	9	2,880.0	60	FLDCT	B0005	ZZZZZ	8	804	19,905
SU13F	W01	10	3,411.0	60	FLDCT	B0005	ZZZZZ	7	804	27,661
SU13F	W01	11	3,621.0	60	FLDCT	B0005	ZZZZZ	21	804	29,889
SU13F	W01	12	3,812.0	60	FLDCT	B0005	ZZZZZ	20	804	32,977
SU13F	W01	13	3,980.0	60	FLDCT	B0005	ZZZZZ	19	804	33,698
SU13F	W01	14	4,156.0	60	FLDCT	B0005	ZZZZZ	18	804	35,566
SU13F	W01	15	2,821.0	60	FLDCT	B0005	ZZZZZ	17	804	22,462
SU13F	W01	16	3,558.0	60	FLDCT	B0005	ZZZZZ	16	804	29,231
SU13F	W01	17	3,639.0	60	FLDCT	B0005	ZZZZZ	15	804	32,202
ZZZZZ	ZZZZZ	18	3,308.0	600	PTBBK	ZZZZZ	ZZZZZ	1	0	3,510
ZZZZZ	ZZZZZ	19	4,193.0	60	RTSCI	ZZZZZ	ZZZZZ	0	0	44,485

Beta Flag

45000 -

Beta Max Flag

60000

Friday, October 30, 2009

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M2350-1 Download BETA Report

File Name : 00000047			Survey Description : SU13F Walls Points 1-6,21-30		
Survey Reason : Final Status					
User ID : RPS2366		Technician Name : Richard Stoney			
Instrument Model : 2350-1		Instrument S/N : 95359		Instrument Cal. Due : 9/30/2010	
Detector Model : 43-68b		Detector S/N : 119337		Detector Cal. Due : 9/30/2010	
Measurement Type : BETA		Detector Type : 02200 : 126 cm ² Gas Proportional Detector			
Detector Area : 126		Efficiency : 0.0938		Survey Date : 10/30/2009	
Minimum Net DPM Observed : -2981		Mean Net DPM : 10764			
Maximum Net DPM Observed : 29631		STDEV Observed : 11529		# of Samples Taken : 20	

Richard Stoney
Print Name

Signature

10-30-2009
Date

Print Name

Signature

Date

Comments:

Material specific background used, A
concrete block background from unpainted block
in receiving area entryway was utilized,
804 cpm / 106 cm².

Sign-Off

Paul Ely
Print Name

Signature

10/30/09
Date

Page 1 of 2

Duratek Beta Survey Report

Download File Name: 00000047

Package ID(L1)	Surface (L2)	Sample #	Counts	Time (Sec)	Count Type(L5)	Material Type(L6)	Grid ID(L7)	Location # (L8)	Bkgd (cpm)	Net (DPM/100cm2)
SU01	F01	0	398.0	60	PRBBK	B9999	ZZZZZ	1		
SU01	F01	1	3,951.0	60	PRSC1	B9999	ZZZZZ	1		
SU01	F01	2	4,332.0	60	PRSC1	B0000	ZZZZZ	1		
SU13F	W0001	3	512.0	60	FLDCT	B0005	ZZZZZ	1	804	-2,471
SU13F	W0001	4	710.0	60	FLDCT	B0005	ZZZZZ	2	804	-795
SU13F	W0001	5	869.0	60	FLDCT	B0005	ZZZZZ	3	804	550
SU13F	W0001	6	567.0	60	FLDCT	B0005	ZZZZZ	4	804	-2,090
SU13F	W0001	7	517.0	60	FLDCT	B0005	ZZZZZ	5	804	-2,428
SU13F	W0001	8	744.0	60	FLDCT	B0005	ZZZZZ	5	804	-508
SU13F	W0001	9	2,333.0	60	FLDCT	B0005	ZZZZZ	22	804	12,937
SU13F	W0001	10	2,175.0	60	FLDCT	B0005	ZZZZZ	23	804	11,800
SU13F	W0001	11	3,269.0	60	FLDCT	B0005	ZZZZZ	24	804	20,857
SU13F	W0001	12	3,273.0	60	FLDCT	B0005	ZZZZZ	25	804	20,890
SU13F	W0001	13	2,509.0	60	FLDCT	B0005	ZZZZZ	26	804	14,426
SU13F	W0001	14	2,797.0	60	FLDCT	B0005	ZZZZZ	27	804	16,863
SU13F	W0001	15	4,100.0	60	FLDCT	B0005	ZZZZZ	28	804	27,898
SU13F	W0001	16	2,955.0	60	FLDCT	B0005	ZZZZZ	29	804	18,200
SU13F	W0001	17	3,217.0	60	FLDCT	B0005	ZZZZZ	30	804	20,417
SU13F	W0001	18	4,517.0	600	PTBBK	B0005	ZZZZZ	31	804	-2,981
SU13F	W0001	19	3,306.0	60	PTSC1	B0005	ZZZZZ	32	804	29,631

Beta Flag	45000	-	
Beta Max Flag	60000		

Friday, October 30, 2009

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20 Oct 2009 11:11 ALPHA/BETA - 1.09 Page #1
Protocol #: 2 Smears H-3 & C-14 User : EaglePicher / ES

Time: 1.00
Data Mode: Dual DPM Nuclides: 3H-14C Quench Sets
Low Energy: 3H
Background Subtract: 1st Vial High Energy: 14C

	LL	UL	LCR	25%	BKG
Region A:	0.0 - 12.0	0	0.0	9.16	
Region B:	12.0 - 156	0	0.0	16.84	
Region C:	0.0 - 0.0	0	0.0	0.00	

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FSS Smears in 20 ml Ultima Gold
Coincidence Time(ns): 16
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EPV\PROT.DAT
Count Data Filename: C:\EPV\DATA2.001

P#PID S#	SMPL_ID	TIME	CPMAA:25%	CPMBB:25%	3H-DPM	14C-DPM	tSIE	FLAG
2 1 1		10.0	9.2 20.9	16.8 15.4	0.00	0.00	433	B
2 1 2	SUI3 Wall#1	1.0	11.8 79.1	6.2 161	33.29	5.74	425	
2 1 3	SUI3 Wall#2	1.0	3.0 239	9.0 117	3.43	10.67	430	
2 1 4	SUI3 Wall#3	1.0	18.3 58.2	36.7 40.5	44.31	41.67	385	
2 1 5	SUI3 Wall#4	1.0	11.6 80.2	14.4 79.8	28.46	16.02	438	
2 1 6	SUI3 Wall#5	1.0	0.6 1109	8.4 123	0.00	10.38	427	
2 1 7	SUI3 Wall#6	1.0	16.2 63.2	21.6 56.3	45.21	24.49	376	
2 1 8	SUI3 Wall#7	1.0	1.4 496	20.6 60.6	0.00	25.48	427	
2 1 9	SUI3 Wall#8	1.0	18.8 37.1	35.2 41.7	42.37	40.72	425	
2 1 10	SUI3 Wall#9	1.0	18.8 37.1	61.2 29.2	32.15	73.13	421	
2 1 11	SUI3 Wall#10	1.0	8.5 102	23.5 55.1	15.74	27.89	432	
2 1 12	SUI3 Wall#11	1.0	17.9 59.0	39.1 38.8	37.85	45.73	428	
2 2 13	SUI3 Wall #12	1.0	11.4 81.5	58.6 30.0	10.66	71.23	415	
2 2 14	SUI3 Wall #13	1.0	8.7 99.4	31.3 45.1	13.61	37.53	427	
2 2 15	SUI3 Wall #14	1.0	25.3 46.7	34.5 31.4	56.28	63.67	413	
2 2 16	SUI3 Wall #15	1.0	4.6 167	16.4 72.0	6.97	19.68	437	
2 2 17	SUI3 Wall #16	1.0	7.8 110	12.4 90.0	17.54	14.16	440	
2 2 18	SUI3 Wall #17	1.0	10.8 84.4	19.2 64.1	24.25	22.10	438	
2 2 19	SUI3 Wall #18	1.0	4.6 167	59.4 38.6	0.00	48.34	429	
2 2 20	SUI3 Wall #19	1.0	3.1 231	16.9 70.6	2.56	20.47	435	
2 2 21	SUI3 Wall #20	1.0	4.3 176	26.7 50.4	1.99	32.53	436	
2 2 22	SUI3 Wall #21	1.0	6.6 124	16.4 72.0	12.88	19.35	437	
2 2 23	SUI3 Wall #22	1.0	4.5 169	14.5 79.4	7.82	17.27	435	
2 2 24	SUI3 Wall #23	1.0	48.2 31.7	83.8 24.1	114.82	96.34	411	
2 2 25	SUI3 Wall #24	1.0	5.5 145	11.5 95.0	11.58	13.49	431	
2 3 26	SUI3 Wall #25	1.0	7.8 108	29.2 47.4	11.47	33.02	435	
2 3 27	SUI3 Wall #26	1.0	5.7 99.9	20.3 61.5	17.34	23.69	441	
2 3 28	SUI3 Wall #27	1.0	7.3 114	7.7 133	18.43	8.43	438	
2 3 29	SUI3 Wall #28	1.0	7.8 106	36.2 40.9	8.71	43.74	433	
2 3 30	SUI3 Wall #29	1.0	17.6 59.8	40.4 38.0	36.17	47.45	425	
2 3 31	SUI3 Wall #30	1.0	1.5 466	24.3 55.5	0.00	30.31	431	

5.0 QUALITY ASSURANCE AND QUALITY CONTROL

All work was performed in a quality manner and under the implementing procedures as listed in Attachment 7.1.

The following Quality Control measures were utilized as an integral part of the survey process.

5.1 Selection of Personnel

Project management and supervisory personnel reviewed and were familiar with the procedures referenced in Attachment 7.1.

Personnel for the FSS were selected based upon their qualifications and experience.

5.2 Written Procedures

Procedures referenced in Attachment 7.1 controlled all survey tasks performed to ensure survey data quality.

5.3 Instrumentation Selection, Calibration, and Operation

Instruments proven to reliably detect C-14 were utilized. EnergySolutions calibrated instruments in accordance with procedure CS-FO-PR-002 (Attachment 7.1) using calibration sources traceable to the NIST. All detectors were subjected to daily response checks, when in use, in accordance with procedure CS-FO-PR-004 (Attachment 7.1).

5.4 Survey Documentation

Records of surveys were documented and managed in accordance with procedure CS-FO-PR-001 (as listed in Attachment 7.1). Survey measurements were identified by the date, technician, instrument type and serial number, detector type and serial number, location code, type of measurement, mode of instrument operation, and sample number, as applicable.

The field data collected was managed using forms. Onsite liquid scintillation data was maintained on its computer-based data management system. All measurements taken during this project were identified by source, type, and sample location to avoid ambiguity. Field records included the following information:

- Site Name, surveyor name, signature, and date
- Sample times
- Records of all measurements (e.g. field screening parameters).

5.5 Records Management

The generation, handling, and storage of survey data packages was controlled by procedure CS-AD-PR-002 (as listed in Attachment 7.1).

6.0 REFERENCES

- 6.1 EnergySolutions, CS-HP-PN-010, *Characterization Report for EaglePicher, Lenexa Kansas*, Rev. 0.
- 6.2 EnergySolutions, CS-HP-PN-011, *Decommissioning Plan for EaglePicher Research and Development Laboratory, Lenexa Kansas*, Rev. 0.
- 6.3 EnergySolutions, ES-QA-PG-001, *Quality Assurance Program*, Rev. 0.
- 6.4 EnergySolutions, CS-RS-PG-001, *Radiation Protection Program Commercial Services Projects*, Rev. 0.
- 6.5 EnergySolutions, CS-SH-PN-030, *EaglePicher Research and Development Laboratory Project Health and Safety Plan*, Rev. 0.
- 6.6 U.S. Nuclear Regulatory Commission, NUREG-1757, *Consolidated Decommissioning Guidance – Decommissioning Process for Materials Licensees*, includes the September 2006 updates.
- 6.7 U.S. Nuclear Regulatory Commission, NUREG 1575, Revision 1, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*; August 2000, includes the June 2001 updates.
- 6.8 *COMPASS Code* Version 1.1.0 was developed under the sponsorship of the U.S. Nuclear Regulatory Commission for implementation of MARSSIM in support of the decommissioning license termination rule (10 CFR Part 20, Subpart E).
- 6.9 Shaw Environmental, Inc., *Historical Site Assessment EaglePicher Pharmaceutical Services LLC 13605 West 96th Terrace Lenexa, Kansas 66215-1297*, December 2008.
- 6.10 Shaw Environmental, Inc., *Soil Derived Concentration Guideline Levels EaglePicher Pharmaceutical Services LL 13605 West 96th Terrace Lenexa, Kansas 66215-1297*, April 2009.
- 6.11 Shaw Environmental, Inc., *Letter from Greg Coffman to Thomas A. Conley of KDHE, RE: Revised Soil DCGL Report*, May 4, 2009.
- 6.12 U.S. Nuclear Regulatory Commission, *Materials License Number 06-20775-01*, issued to EnergySolutions.
- 6.13 Kansas Department of Health and Environment, *State of Kansas Radioactive Materials License Reciprocity Approval Number 2009-063*, October 19, 2009.

7.0 ATTACHMENTS

- 7.1 EnergySolutions Plans and Procedures
- 7.2 Instrument Calibration Certificates
- 7.3 Instrument Static and Scan MDC Worksheets
- 7.4 COMPASS Survey Plans and Survey Location Calculations
- 7.5 Landfill Activity Estimate
- 7.6 Laboratory Analytical Reports

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Attachment 7.1: EnergySolutions Plans and Procedures

Procedure Number	Procedure Title
CS-FO-PR-001	General Radiological Survey and Air Sampling Procedure for Field Projects
CS-FO-PR-002	Calibration and Maintenance of Radiological Survey and Sampling Equipment Procedure
CS-FO-PR-004	QA/QC of Portable Radiological Survey Instruments
CP-CSA-203	Ludlum Model 2350-1 Series Data Logger Download
CP-INST-201	Operation of the Ludlum Model 2350-1 Series Data Loggers
ES-AD-PR-009	Control of Measuring and Test Equipment

Attachment 7.2: Instrument Calibration Certificates

Summary of FSS Beta Survey Instruments Used

Instrument		Detector		
Model	Serial Number	Model	Serial Number	C-14 Efficiency (%)
Ludlum 2350-1	80502	Ludlum 43-68	095523	6.81
Ludlum 2350-1	95359	Ludlum 43-68	119337	9.38
Ludlum 2350-1	117566	Ludlum 43-68	091028	7.48
Ludlum 2350-1	117566	Ludlum 43-68	134489	7.57%
Ludlum 2350-1	126198	Ludlum 43-68	075149	6.81%
Ludlum 2350-1	117573	Ludlum 44-10	157372	N/A
Ludlum 2350-1	126183	Ludlum 44-10	192598	N/A
Ludlum 2350-1	117555	Ludlum 44-10	227358	N/A
Ludlum 177	45602	Ludlum 44-9	176080	N/A
Packard Tri-Carb	401663	Smear Counter	401663	95.83%

Ludlum 43-68 #095523 Calibration Certificate



Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

DETECTOR
CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-68B	
Contact Name: Tony Riggs				Serial Number: 095523	
Customer Purchase Order Number: N/A		Work Order Number: 2009-10385		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
1) Source Nuclide: C-14		Serial Number: 010002		Activity (dpm): 260,460	
				Certification Date: 12/14/99	
Parameter	As Found	As Left	Precision Test		CPM (Source #1)
Count 1	37,510	37,510	Count 1(Heel)		33,104
Count 2	37,660	37,660	Count 2(Center)		37,523
Count 3	37,537	37,537	Count 3(Toe)		32,270
Average	37,569	37,569	Average		34,299
Background (cpm)	338.8	338.8	Tolerance		All counts within $\pm 10\%$ of Average
Net Counts	37,230	37,230	Pass/Fail		PASS
Efficiency	14.3%	14.3%			
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 22.1E-6	Calibration Constant (CC): 1.0
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number	Due Date	Background (cpm)	Operating Voltage	Threshold
2350-1	80502	09/30/2010	338.8	1750V	40 = 4mV
Detector Setup Report		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Barcode Report		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
			Voltage Plateau		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
COMMENTS					
Calibrated with 25Ft. Cable			Calibrated in accordance with CP-IN-WI-237 Rev 1		
10 minute background		1 LAYER MYLAR (0.4mg)		Efficiency determined w/43-68 source jig	
STATEMENT OF CERTIFICATION					
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).					
Detector					
Certified By: <i>M. Paul</i>		Reviewed By: <i>Jeff Dabine</i>		Date: 9/30/09	
Certification Date: 09/30/2009				Certification Due: 09/30/2010	

background plateau 43-68#095523 9/28/2009

900	0
950	4
1000	0
1050	0
1100	0
1150	1
1200	3
1250	2
1300	6
1350	6
1400	10
1450	4
1500	7
1550	17
1600	65
1650	123
1700	235
1750	372
1800	681
1850	895
1900	1069
1950	1286

alpha plateau Th-230#119738 18,600dpm

900	0
950	0
1000	0
1050	0
1100	35
1150	1538
1200	2751
1250	3471
1300	3810
1350	3916
1400	3948
1450	4035
1500	4031

beta plateau Tc-99#099608 18,600dpm

1400	4
1450	13
1500	168
1550	945
1600	2062
1650	3457
1700	4952
1750	5612
1800	5942
1850	6626
1900	7461
1950	9215

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D2 in the Model 2350.
Today's date is 09/30/2009.
The current time of day is: 12:19:19.

I have verified the list below
has NO discrepancies with the DETECTOR SETTINGS TABLE: MP

Comments:

Model 2350 Serial # =	80502.
User I.D. =	
High Voltage =	1750 volts.
Threshold =	40.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.210000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-68B.
Detector Serial # =	095523.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.3 volts.

Ludlum 43-68 #119337 Calibration Certificate



Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

DETECTOR
CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-68B	
Contact Name: Tony Riggs				Serial Number: 119337	
Customer Purchase Order Number: N/A		Work Order Number: 2009-10385		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
1) Source Nuclide: C-14		Serial Number: 010002		Activity (dpm): 260,460	
				Certification Date: 12/14/99	
Parameter	As Found	As Left	Precision Test		CPM (Source #1)
Count 1	51,911	51,911	Count 1(Heel)		45,030
Count 2	51,619	51,619	Count 2(Center)		51,303
Count 3	51,448	51,448	Count 3(Toe)		44,006
Average	51,659	51,659	Average		46,780
Background (cpm)	269.6	269.6	Tolerance		All counts within $\pm 10\%$ of Average
Net Counts	51,389	51,389	Pass/Fail		PASS
Efficiency	19.7%	19.7%			
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 22.1E-6	Calibration Constant (CC): 1.0
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number		Due Date	Background (cpm)	Operating Voltage
2350-1	95359		09/30/2010	269.6	1800V
Detector Setup Report		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Barcode Report		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Voltage Plateau YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>					
COMMENTS					
Calibrated with 25Ft. Cable			Calibrated in accordance with CP-IN-WI-237 Rev 1		
10 minute background		1 LAYER MYLAR (0.4mg)		Efficiency determined w/43-68 source jig	
STATEMENT OF CERTIFICATION					
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).					
Detector					
Certified By: <i>M. Paul</i>		Reviewed By: <i>[Signature]</i>		Date: 9/30/09	
Certification Date: 09/30/2009				Certification Due: 09/30/2010	

background plateau 43-68#119337 9/28/2009

900	0
950	0
1000	0
1050	0
1100	0
1150	2
1200	0
1250	3
1300	2
1350	1
1400	3
1450	11
1500	5
1550	13
1600	44
1650	101
1700	241
1750	276
1800	329
1850	375
1900	586
1950	709

alpha plateau Th-230#119738 18,600dpm

900	0
950	0
1000	0
1050	2
1100	633
1150	2082
1200	3257
1250	3838
1300	4050
1350	4135
1400	4222
1450	4216
1500	4239

beta plateau Tc-99#099608 18,600dpm

1400	16
1450	37
1500	453
1550	1474
1600	2840
1650	4441
1700	5438
1750	6237
1800	7076
1850	8872

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D2 in the Model 2350.
Today's date is 06/13/2002.
The current time of day is: 03:14:00.

I have verified the list below
has NO discrepancies with the DETECTOR SETTINGS TABLE: MP

Comments:

Model 2350 Serial # =	95359.
User I.D. =	
High Voltage =	1800 volts.
Threshold =	40.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.210000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-68B.
Detector Serial # =	119337.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	6.1 volts.

Ludlum 43-68 #091028 Calibration Certificate



Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

DETECTOR
CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-68B	
Contact Name: Tony Riggs				Serial Number: 091028	
Customer Purchase Order Number: N/A		Work Order Number: 2009-10385		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
1) Source Nuclide: C-14		Serial Number: 010002		Activity (dpm): 260,460	
				Certification Date: 12/14/99	
Parameter	As Found	As Left	Precision Test		CPM (Source #1)
Count 1	41,046	41,046	Count 1(Heel)		33,763
Count 2	41,315	41,315	Count 2(Center)		41,131
Count 3	41,525	41,525	Count 3(Toe)		37,512
Average	41,295	41,295	Average		37,469
Background (cpm)	278.4	278.4	Tolerance		All counts within $\pm 10\%$ of Average
Net Counts	41,017	41,017	Pass/Fail		PASS
Efficiency	15.7%	15.7%			
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 22.1E-6	Calibration Constant (CC): 1.0
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number		Due Date	Background (cpm)	Operating Voltage
2350-1	117566		09/28/2010	278.4	1800V
Detector Setup Report		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Barcode Report		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Voltage Plateau YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>					
COMMENTS					
Calibrated with 25Ft. Cable			Calibrated in accordance with CP-IN-WI-237 Rev 1		
10 minute background		1 LAYER MYLAR (0.4mg)		Efficiency determined w/43-68 source jig	
STATEMENT OF CERTIFICATION					
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).					
Detector					
Certified By: <i>M. Paul</i>	Reviewed By: <i>Jeff Dulsina</i>		Date: 9/30/09		
Certification Date: 09/30/2009			Certification Due: 09/30/2010		

background plateau 43-68#091028 9/29/2009

900	0
950	0
1000	0
1050	0
1100	2
1150	1
1200	6
1250	15
1300	11
1350	9
1400	9
1450	13
1500	13
1550	22
1600	29
1650	66
1700	101
1750	228
1800	290
1850	372
1900	439
1950	565

alpha plateau Th-230#119738 18,600dpm

900	0
950	0
1000	0
1050	0
1100	1
1150	1132
1200	2659
1250	3542
1300	3883
1350	4106
1400	4127
1450	4172
1500	4175

beta plateau Tc-99#099608 18,600dpm

1400	10
1450	13
1500	43
1550	454
1600	1422
1650	2768
1700	4417
1750	5429
1800	5871
1850	6021
1900	187271

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D2 in the Model 2350.
Today's date is 06/13/2002.
The current time of day is: 20:56:24.

I have verified the list below
has NO discrepancies with the DETECTOR SETTINGS TABLE: MP

Comments:

Model 2350 Serial # =	117566.
User I.D. =	
High Voltage =	1800 volts.
Threshold =	40.
Window =	1000,Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.210000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-68B.
Detector Serial # =	091028.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.9 volts.

Ludlum 43-68 #134489 Calibration Certificate



Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

DETECTOR
CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-68B	
Contact Name: Tony Riggs				Serial Number: 134489	
Customer Purchase Order Number: N/A		Work Order Number: 2009-05619		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
1) Source Nuclide: C ¹⁴		Serial Number: 019708		Activity (dpm): 26,045	
				Certification Date: 11/20/96	
Parameter	As Found	As Left	Precision Test		CPM (Source #1)
Count 1	4627	4627	Count 1(Heel)		4627
Count 2	4441	4441	Count 2(Center)		4441
Count 3	4436	4436	Count 3(Toe)		4436
Average	4501.3	4501.3	Average		4501.3
Background (cpm)	368	368	Tolerance		All counts within $\pm 10\%$ of Average
Net Counts	4133.3	4133.3	Pass/Fail		PASS
Efficiency	15.9%	15.9%			
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 22.1E-6	
				Calibration Constant (CC): 1.0	
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number	Due Date	Background (cpm)	Operating Voltage	Threshold
2350-1	117566	10/08/09	368	1850V	40 = 4mV
Detector Setup Report YES <input checked="" type="checkbox"/> NO		Barcode Report YES <input checked="" type="checkbox"/> NO		Voltage Plateau YES <input checked="" type="checkbox"/> NO	
COMMENTS					
Calibrated with 25Ft. Cable Short cycled calibration date 10 minute background			Calibrated in accordance with CP-IN-WI-237 Rev 1 1 LAYER MYLAR (0.4mg) Efficiency determined w/43-68 source jig		
STATEMENT OF CERTIFICATION					
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).					
Detector					
Certified By: <i>[Signature]</i>		Reviewed By: <i>[Signature]</i>		Date: 7/1/09	
Certification Date: 07/01/2009			Certification Due: 02/25/2010		

BACGROUND PLATEAU 43-68 #134489 (1 LAYER MYLAR) 25FT CABLE 2/24/209

900	0
950	0
1000	0
1050	0
1100	0
1150	1
1200	1
1250	5
1300	2
1350	2
1400	4
1450	6
1500	7
1550	11
1600	23
1650	57
1700	98
1750	213
1800	283
1850	282
1900	301
1950	343

ALPHA PLATEAU TH-230 #119709 2,442DPM

900	0
950	0
1000	0
1050	0
1100	0
1150	133
1200	291
1250	462
1300	502
1350	510
1400	509
1450	496
1500	530

BETA PLATEAU TC-99 #099608 21,312 DPM

1400	2
1450	8
1500	216
1550	852
1600	1805
1650	3033
1700	4324
1750	5189
1800	5403
1850	5434
1900	5630
1950	6182

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D2 in the Model 2350.
Today's date is 02/25/2009.
The current time of day is: 13:14:49.

I have verified the list below
has NO discrepancies with the DETECTOR SETTINGS TABLE: RA

Comments:

Model 2350 Serial # =	129395.
User I.D. =	
High Voltage =	1850 volts.
Threshold =	40.
Window =	1000,Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.210000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-68B.
Detector Serial # =	134489.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.5 volts.

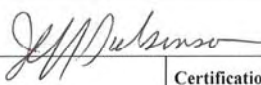
Ludlum 43-68 #075149 Calibration Certificate



Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

DETECTOR
CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-68B	
Contact Name: Tony Riggs				Serial Number: 075149	
Customer Purchase Order Number: N/A		Work Order Number: 2009-05619		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
1) Source Nuclide: C ¹⁴		Serial Number: 019708		Activity (dpm): 26,045	
				Certification Date: 11/20/96	
Parameter	As Found	As Left	Precision Test		CPM (Source #1)
Count 1	4164	4164	Count 1(Heel)		4164
Count 2	4129	4129	Count 2(Center)		4129
Count 3	3873	3873	Count 3(Toe)		3873
Average	4055.3	4055.3	Average		4055.3
Background (cpm)	335	335	Tolerance		All counts within ±10% of Average
Net Counts	3720.3	3720.3	Pass/Fail		PASS
Efficiency	14.3%	14.3%			
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 22.4E-6	Calibration Constant (CC): 1.0
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number	Due Date	Background (cpm)	Operating Voltage	Threshold
2350-1	126198	11/04/09	335	1750V	40 = 4mV
Detector Setup Report		YES ✓ NO	Barcode Report		YES ✓ NO
			Voltage Plateau		YES ✓ NO
COMMENTS					
Calibrated with 25Ft. Cable			Calibrated in accordance with CP-IN-WI-237 Rev 1		
10 minute background		1 LAYER MYLAR (0.4mg)		Efficiency determined w/43-68 source jig	
STATEMENT OF CERTIFICATION					
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).					
Detector					
Certified By: MP For T.Riggs		Reviewed By: 		Date: 7/2/09	
Certification Date: 07/01/2009			Certification Due: 07/01/2010		

BACKGROUND PLATEAU 43-68 #075149 7/1/09 25 FT CABLE

900	0
950	0
1000	0
1050	0
1100	0
1150	0
1200	1
1250	4
1300	4
1350	6
1400	3
1450	5
1500	4
1550	11
1600	17
1650	62
1700	115
1750	239
1800	370
1850	508
1900	670
1950	1354

SOURCE PLATEAU Th230 #129403 AT 18,660DPM

900	0
950	0
1000	0
1050	0
1100	4
1150	51
1200	1071
1250	2785
1300	3801
1350	4157
1400	4508
1450	4602
1500	4560

SOURCE PLATEAU Tc99 #119718 AT 20,520DPM

1400	18
1450	14
1500	18
1550	100
1600	568
1650	1649
1700	3127
1750	4678
1800	5899
1850	7536
1900	9843

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D4 in the Model 2350.
Today's date is 07/01/2009.
The current time of day is: 15:32:28.

I have verified the list below
has NO discrepancies with the DETECTOR SETTINGS TABLE: *12*

Comments:

Model 2350 Serial # =	126198.
User I.D. =	
High Voltage =	1750 volts.
Threshold =	40.
Window =	1000,Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.240000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-68B.
Detector Serial # =	075149.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	6.0 volts.

Ludlum 44-10 #157372 Calibration Certificate



CALIBRATION
CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 44-10			
Contact Name: Tony Riggs				Serial Number: 157372			
Customer Purchase Order Number: N/A		Work Order Number: 2009-10108		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: Cs ¹³⁷		Serial Number: 019454		Activity: 5μCi nominal		Certification Date: N/A (Used for Plateau Only)	
2) Source Nuclide: Cs ¹³⁷		Serial Number: 049711		Activity: Variable		Certification Date: 07/18/08	
Scaler Information		Precision Test		mR/Hr (Source #2)			
2350-1		#117573		Count 1		2.03	
Due Date		04/18/2010		Count 2		2.04	
Threshold		T=100 (10mV)		Count 3		2.03	
Cable Length		5ft.		Average		2.033	
MC-250L #8029		Temp: 19.2°C		Tolerance ±10%		All counts within ±10% of Average	
MC-250L #8029		Press: 736mmHg		Pass/Fail		Pass	
Humidity Pen #958670		Humidity: 51%		MC-250L #8029 Due: 8/26/09		Pen #958670 Due: 4/22/09	
Low Sample Activity (400uR/hr): Using Source #2 = 71,100		High Sample Activity (2mR/hr): Using Source #2 = 256,238		Dead Time (DT): 1.634525E-05		Calibration Constant (CC): 5.904308E+10	
ATTACHMENTS				DETECTOR DATA: DOSE RATE PROBES (mR/Hr)			
Detector Setup Report		YES ✓ NO		Desired Exposure		Tolerance ±10%	
Barcode Report		YES ✓ NO		0.400		0.360-0.440	
Voltage Plateau:		YES ✓ NO		1		0.90-1.10	
High Voltage: 1200				2		1.8-2.2	
						2.03	
						2.03	
COMMENTS							
Detectors set up with a 2350-1 may be used with any 2350-1 provided that the setup parameters are scanned into the 2350-1 prior to use with that specific detector							
Calibrated with 5ft. Cable							
STATEMENT OF CERTIFICATION							
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).							
Detector							
Certified By:		Reviewed By:		Date: 4/22/09			
Certification Date: 04/21/2009				*Certification Due (6mo): 10/21/2009			
				*certification Due (12mo): 04/21/2010			

* Calibration due date is dependant on users regulatory requirements.

BACKGROUND PLATEAU 44-10 #157372 4/18/2009

700	13
750	25
800	45
850	100
900	185
950	282
1000	483
1050	592
1100	627
1150	744
1200	738
1250	755
1300	743
1350	794

SOURCE PLATEAU Cs137 #019454 5uCi

700	17
750	24
800	726
850	1045
900	1428
950	1857
1000	2212
1050	2497
1100	2646
1150	2727
1200	2844
1250	2907
1300	2880
1350	2894

Auto Ranging : Enabled

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DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D3 in the Model 2350.
Today's date is 04/21/2009.
The current time of day is: 13:56:22.

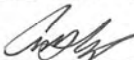
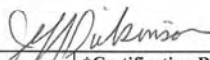
I have verified the list below
has NO discrepancies with the DETECTOR SETTINGS TABLE: *K*

Comments:

Model 2350 Serial # =	117573.
User I.D. =	
High Voltage =	1200 volts.
Threshold =	100.
Window =	1000,Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	R.
Readout Time Base =	hr.
Readout Range Multiplier =	auto.
Detector Dead Time =	1.634525E-05.
Detector Calibration Constant =	5.904308E+10.
Detector Model =	44-10.
Detector Serial # =	157372.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	6.1 volts.

Duratek

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 44-10			
Contact Name: Tony Riggs				Serial Number: 192598			
Customer Purchase Order Number: N/A		Work Order Number: 2009-		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: Cs ¹³⁷		Serial Number: 019454		Activity: 5µCi nominal		Certification Date: N/A (Used for Plateau Only)	
2) Source Nuclide: Cs ¹³⁷		Serial Number: 049711		Activity: Variable		Certification Date: 07/18/08	
Scaler Information		Precision Test			mR/Hr (Source #2)		
2350-1	#117014	Count 1			2.00		
Due Date	09/25/09	Count 2			2.01		
Threshold	T=100 (10mV)	Count 3			1.99		
Cable Length	5ft.	Average			2.00		
D-814: 2551	Temp: 22.5 °C	Tolerance ±10%			All counts within ±10% of Average		
D-814: 2551	Press: 746mmHg	Pass/Fail			Pass		
Humidity	Humidity: 35%						
Low Sample Activity (400uR/hr): Using Source #2 = 68,883		High Sample Activity (2mR/hr): Using Source #2 = 256,708		Dead Time (DT): 1.488005E-05		Calibration Constant (CC): 5.648714E+10	
ATTACHMENTS		DETECTOR DATA: DOSE RATE PROBES (mR/Hr)					
Detector Setup Report	YES ✓ NO	Desired Exposure		Tolerance ±10%		As Found As Left	
Barcode Report	YES ✓ NO	0.400		0.360-0.440		0.401 0.412	
Voltage Plateau:	YES ✓ NO	1		0.90-1.10		0.965 0.959	
High Voltage:	1000V	2		1.8-2.2		2.00 2.00	
COMMENTS							
Detectors set up with a 2350-1 may be used with any 2350-1 provided that the setup parameters are scanned into the 2350-1 prior to use with that specific detector							
Calibrated with 5ft. Cable							
STATEMENT OF CERTIFICATION							
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).							
Detector							
Certified By: 		Reviewed By: 		Date: 4/16/09			
Certification Date: 04/15/2009				*Certification Due (6mo): 10/15/2009 *Certification Due (12mo): 04/15/2010			

Attachments Page 22 of 84

BACKGROUND PLATEAU 44-10 #192598 4/15/2009

700	288
750	495
800	637
850	675
900	701
950	689
1000	750
1050	761
1100	710
1150	729
1200	828
1250	3452
1300	11469
1300	11393
1300	7898
1300	7017
1350	36376

Source Plateau Cs137 #019454 5uCi

700	5389
750	6166
800	6566
850	7009
900	7021
950	7264
1000	7505
1000	7337
1050	7430
1100	7294
1150	7580
1150	7455
1200	7361
1250	7453
1300	8022

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DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D1 in the Model 2350.
Today's date is 04/16/2009.
The current time of day is: 07:15:32.

I have verified the list below
has NO discrepancies with the DETECTOR SETTINGS TABLE: AK

Comments:

Model 2350 Serial # =	117014.
User I.D. =	.
High Voltage =	1000 volts.
Threshold =	100.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	R.
Readout Time Base =	hr.
Readout Range Multiplier =	auto.
Detector Dead Time =	1.488005E-05.
Detector Calibration Constant =	5.648714E+10.
Detector Model =	44-10.
Detector Serial # =	192598.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.8 volts.

Star Key Ratemeter Function : Start Scaler

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Ludlum 44-10 #227358 Calibration Certificate



CALIBRATION
CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 44-10			
Contact Name: Tony Riggs				Serial Number: 227358			
Customer Purchase Order Number: N/A		Work Order Number: N/A		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: Cs ¹³⁷		Serial Number: 019454		Activity: 5μCi nominal		Certification Date: N/A (Used for Plateau Only)	
2) Source Nuclide: Cs ¹³⁷		Serial Number: 049711		Activity: Variable		Certification Date: 07/18/08	
Scaler Information		Precision Test		mR/Hr (Source #2)			
2350-1	#82958	Count 1		2.01			
Due Date	09/12/09	Count 2		1.99			
Threshold	T=100 (10mV)	Count 3		1.98			
Cable Length	5ft.	Average		1.99			
D-814: 2551	Temp: 17.6°C	Tolerance ±10%		All counts within ±10% of Average			
D-814: 2551	Press: 746 mmHg	Pass/Fail		Pass			
Humidity	Humidity: 44%						
Low Sample Activity (400uR/hr): Using Source #2 = 72,119		High Sample Activity (2mR/hr): Using Source #2 = 255,020		Dead Time (DT): 1.722099E-05		Calibration Constant (CC): 6.033360E+10	
ATTACHMENTS		DETECTOR DATA: DOSE RATE PROBES (mR/Hr)					
Detector Setup Report	YES ✓ NO	Desired Exposure		Tolerance ±10%		As Found	As Left
Barcode Report	YES ✓ NO	0.400		0.360-0.440		0.394	0.403
Voltage Plateau:	YES ✓ NO	1		0.90-1.10		0.927	.965
High Voltage:	1200V	2		1.8-2.2		1.94	2.01
COMMENTS							
Detectors set up with a 2350-1 may be used with any 2350-1 provided that the setup parameters are scanned into the 2350-1 prior to use with that specific detector							
Calibrated with 5ft. Cable							
STATEMENT OF CERTIFICATION							
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).							
Detector							
Certified By: <i>[Signature]</i>		Reviewed By: <i>[Signature]</i>		Date: 5/18/09			
Certification Date: 05/18/2009				Certification Due: 05/18/2010			

BACKGROUND PLATEAU 44-10 #227358 5/18/2009

700	53
750	83
800	162
850	282
900	520
950	693
1000	765
1050	857
1100	834
1150	814
1200	813
1250	842
1300	890
1350	849

SOURCE PLATEAU Cs137 #019454 5uCi button

700	791
750	1608
800	2381
850	3192
900	3934
950	4397
1000	4677
1050	4712
1100	4891
1150	4961
1200	4984
1250	5085
1300	4970
1350	5137

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D1 in the Model 2350.
Today's date is 05/18/2009.
The current time of day is: 15:24:56.

I have verified the list below
has NO discrepancies with the DETECTOR SETTINGS TABLE: *PC*

Comments:

Model 2350 Serial # =	82958.
User I.D. =	
High Voltage =	1200 volts.
Threshold =	100.
Window =	1000,Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	R.
Readout Time Base =	hr.
Readout Range Multiplier =	auto.
Detector Dead Time =	1.722099E-05.
Detector Calibration Constant =	6.033360E+10.
Detector Model =	44-10.
Detector Serial # =	227358.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	6.4 volts.

Ludlum 2350-1 #80502 Calibration Certificate



Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

CALIBRATION
CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION		
Customer Name: Duratek Inc. - Instrument Services Facility		Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2350-1	Serial Number: 80502	
Contact Name: Tony Riggs		Probe: N/A	Serial Number: N/A	
Customer Purchase Order Number: N/A	Work Order Number: 2009-10385	Calibration Method: Electronic and Source		
INSTRUMENT CALIBRATION INFORMATION				
Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments
		Before Calibration	After Calibration	
400	400	398	398	Pulser: 120935 Cal Due: 08/30/10
4,000	4,000	3,985	3,985	DVM: 88020324 Cal Due: 10/31/09
40,000	40,000	39,915	39,915	D-814: 2525 Cal Due: 12/10/09
400,000	400,000	399,138	399,138	Humidity: 992290 Cal Due: 02/03/10
HV Cal Values (M2350 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	EPPROM Version: 37122N21
600 (540-660)	600	609	609	Temp: 22.1° C
1,200 (1,080-1,320)	1,200	1,204	1,204	Pressure: 741 mmHg
1,800 (1,620-1,980)	1,800	1,796	1,796	Humidity: 42%
Parameter	Tolerance (±10%)	As Found	As Left	
Threshold T = 100	10 ± (9 to 11) mVDC	10.2	10.2	Geotropism: SAT ACK/Scroll: SAT
Threshold T = 500	50 ± (45 to 55) mVDC	46.7	46.7	BAT>4.5: SAT Volume: SAT
Threshold T = 1000	100 ± (90 to 110) mVDC	98	98	Count: SAT Audio Divide: SAT
Window Width W = 100	10 ± (9 to 11) mVDC	10	10	Alarms: SAT Lamp: SAT
Display-to-mV ratio:	100 to 10 mV			Overload Test: SAT Physical cond: SAT
STATEMENT OF CERTIFICATION				
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).				
Instrument				
Calibrated By: Mike Paul	Reviewed By: [Signature]	Date: 9/30/09		
Calibration Date: 09/30/2009		Calibration Due: 09/30/2010		

Ludlum 2350-1 #95359 Calibration Certificate



CALIBRATION
CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION		
Customer Name: Duratek Inc. - Instrument Services Facility		Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2350-1	Serial Number: 95359	
Contact Name: Tony Riggs		Probe: N/A	Serial Number: N/A	
Customer Purchase Order Number: N/A	Work Order Number: 2009-10385	Calibration Method: Electronic and Source		
INSTRUMENT CALIBRATION INFORMATION				
Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments
		Before Calibration	After Calibration	
400	400	398	398	Pulser: 120935 Cal Due: 08/30/10
4,000	4,000	3,972	3,972	DVM: 88020324 Cal Due: 10/31/09
40,000	40,000	40,141	40,141	D-814: 2525 Cal Due: 12/10/09
400,000	400,000	397,145	397,145	Humidity: 992290 Cal Due: 02/03/10
HV Cal Values (M2350 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	EPPROM Version: 37122N21
600 (540-660)	600	607	607	Temp: 22.1 °C
1,200 (1,080-1,320)	1,200	1,201	1,201	Pressure: 741 mmHg
1,800 (1,620-1,980)	1,800	1,789	1,789	Humidity: 42%
Parameter	Tolerance (±10%)	As Found	As Left	
Threshold T = 100	10 ± (9 to 11) mVDC	10.5	10.5	Geotropism: SAT ACK/Scroll: SAT
Threshold T = 500	50 ± (45 to 55) mVDC	47.5	47.5	BAT>4.5: SAT Volume: SAT
Threshold T = 1000	100 ± (90 to 110) mVDC	96	96	Count: SAT Audio Divide: SAT
Window Width W = 100	10 ± (9 to 11) mVDC	10	10	Alarms: SAT Lamp: SAT
Display-to-mV ratio:	100 to 10 mV			Overload Test: SAT Physical cond: SAT
STATEMENT OF CERTIFICATION				
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).				
Instrument				
Calibrated By: Mike Paul	Reviewed By: Jeff Robinson	Date: 9/30/09		
Calibration Date: 09/30/2009		Calibration Due: 09/30/2010		

Ludlum 2350-1 #117566 Calibration Certificate



Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

CALIBRATION
CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION		
Customer Name: Duratek Inc. - Instrument Services Facility		Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2350-1	Serial Number: 117566	
Contact Name: Tony Riggs		Probe: N/A	Serial Number: N/A	
Customer Purchase Order Number: N/A	Work Order Number: 2009-10385	Calibration Method: Electronic and Source		
INSTRUMENT CALIBRATION INFORMATION				
Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments
		Before Calibration	After Calibration	
400	400	398	398	Pulser: 120935 Cal Due: 08/30/10
4,000	4,000	3,981	3,981	DVM: 88020324 Cal Due: 10/31/09
40,000	40,000	39,805	39,805	D-814: 2525 Cal Due: 12/10/09
400,000	400,000	398,437	398,437	Humidity: 992290 Cal Due: 02/03/10
HV Cal Values (M2350 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	EPPROM Version: 37122N21
600 (540-660)	600	603	603	Temp: 24.9 °C
1,200 (1,080-1,320)	1,200	1,195	1,195	Pressure: 734 mmHg
1,800 (1,620-1,980)	1,800	1,785	1,785	Humidity: 23%
Parameter	Tolerance (±10%)	As Found	As Left	
Threshold T = 100	10 ± (9 to 11) mVDC	10.4	10.4	Geotropism: SAT ACK/Scroll: SAT
Threshold T = 500	50 ± (45 to 55) mVDC	46.5	46.5	BAT>4.5: SAT Volume: SAT
Threshold T = 1000	100 ± (90 to 110) mVDC	92	92	Count: SAT Audio Divide: SAT
Window Width W = 100	10 ± (9 to 11) mVDC	10	10	Alarms: SAT Lamp: SAT
Display-to-mV ratio:	100 to 10 mV		Overload Test: SAT Physical cond: SAT	
STATEMENT OF CERTIFICATION				
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).				
Instrument				
Calibrated By: <i>Nick Paul</i>	Reviewed By: <i>Jeff Dikenson</i>	Date: 9/28/09		
Calibration Date: 09/28/2009		Calibration Due: 09/28/2010		

Ludlum 2350-1 #126198 Calibration Certificate



Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

CALIBRATION
CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION		
Customer Name: Duratek Inc. - Instrument Services Facility		Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2350-1	Serial Number: 126198	
Contact Name: Tony Riggs		Probe: N/A	Serial Number: N/A	
Customer Purchase Order Number: N/A	Work Order Number: 2008-05400	Calibration Method: Electronic and Source		
INSTRUMENT CALIBRATION INFORMATION				
Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments
		Before Calibration	After Calibration	
400	400	398	398	Pulser: 120935 Cal Due: 09/11/09
4,000	4,000	3,978	3,978	DVM: 93950304 Cal Due: 03/27/09
40,000	40,000	39,782	39,782	MC-250L: 8029 Cal Due: 08/26/09
400,000	400,000	398,255	398,255	Humidity: 992290 Cal Due: 03/28/09
HV Cal Values (M2350 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	EPPROM Version: 37122N21
600 (540-660)	600	603	603	Temp: 21.4 °C
1,200 (1,080-1,320)	1,200	1,193	1,193	Pressure: 747 mmHg
1,800 (1,620-1,980)	1,800	1,781	1,781	Humidity: 33%
Parameter	Tolerance (±10%)	As Found	As Left	
Threshold T = 100	10 ± (9 to 11) mVDC	10.3	10.3	Geotropism: SAT ACK/Scroll: SAT
Threshold T = 500	50 ± (45 to 55) mVDC	49.7	49.7	BAT>4.5: SAT Volume: SAT
Threshold T =1000	100 ± (90 to 110) mVDC	99	99	Count: SAT Audio Divide: SAT
Window Width W = 100	10 ± (9 to 11) mVDC	10	10	Alarms: SAT Lamp: SAT
Display-to-mV ratio:	100 to 10 mV		Overload Test: SAT Physical cond: SAT	
STATEMENT OF CERTIFICATION				
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).				
Instrument				
Calibrated By: <i>M. Paul</i>		Reviewed By: <i>Jeff Dakin</i>	Date: <i>11/4/08</i>	
Calibration Date: 11/04/08		Calibration Due: 11/04/09		

Ludlum 2350-1 #117573 Calibration Certificate



CALIBRATION
CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION			INSTRUMENT INFORMATION		
Customer Name: Duratek Inc. - Instrument Services Facility			Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763			Model: 2350-1	Serial Number: 117573	
Contact Name: Tony Riggs			Probe: N/A	Serial Number: N/A	
Customer Purchase Order Number: N/A	Work Order Number: 2009-10108		Calibration Method: Electronic and Source		
INSTRUMENT CALIBRATION INFORMATION					
Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments	
		Before Calibration	After Calibration	Calibrated in accordance with CP-IN-WI-239 Rev 1	
400	400	400	400	Pulser: 246163	Cal Due: 11/04/09
4,000	4,000	4,012	4,012	DVM: 97960214	Cal Due: 02/05/10
40,000	40,000	40,011	40,011	MC-250L: 8029	Cal Due: 08/26/09
400,000	400,000	400,589	400,589	Humidity: 958670	Cal Due: 04/22/09
HV Cal Values (M2350 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	EPPROM Version: 37122N21	
600 (540-660)	600	605	605	Temp: 26.5 °C	
1,200 (1,080-1,320)	1,200	1,203	1,203	Pressure: 744 mmHg	
1,800 (1,620-1,980)	1,800	1,797	1,797	Humidity: 30%	
Parameter	Tolerance (±10%)	As Found	As Left		
Threshold T = 100	10 ± (9 to 11) mVDC	10.5	10.5	Geotropism: SAT	ACK/Scroll: SAT
Threshold T = 500	50 ± (45 to 55) mVDC	55	55	BAT>4.5: SAT	Volume: SAT
Threshold T = 1000	100 ± (90 to 110) mVDC	108	108	Count: SAT	Audio Divide: SAT
Window Width W = 100	10 ± (9 to 11) mVDC	10	10	Alarms: SAT	Lamp: SAT
Display-to-mV ratio:	100 to 10 mV			Overload Test: SAT Physical cond: SAT	
STATEMENT OF CERTIFICATION					
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).					
Instrument					
Calibrated By:	Reviewed By:		Date: 4/20/09		
Calibration Date: 04/18/2009		*Calibration Due (6mo): 10/18/2009 *Calibration Due (12mo): 04/18/2010			

* Calibration due date is dependant on users regulatory requirements.

Ludlum 2350-1 #126183 Calibration Certificate



Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

CALIBRATION
CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION		
Customer Name: Duratek Inc. - Instrument Services Facility		Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2350-1	Serial Number: 126183	
Contact Name: Tony Riggs		Probe: N/A	Serial Number: N/A	
Customer Purchase Order Number: N/A	Work Order Number: 2009-10505	Calibration Method: Electronic		
INSTRUMENT CALIBRATION INFORMATION				
Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments
		Before Calibration	After Calibration	
400	400	400	400	Pulser: 151067 Cal Due: 04/30/10
4,000	4,000	3,986	3,986	DVM: 97960214 Cal Due: 02/05/10
40,000	40,000	39,945	39,945	D-814: 3590 Cal Due: 07/09/10
400,000	400,000	399,461	399,461	Humidity: 992290 Cal Due: 02/03/10
HV Cal Values (M2350 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	CP Firmware Version: 37122N21
600 (540-660)	600	596	596	Temp: 23.6 °C
1,200 (1,080-1,320)	1,200	1,179	1,179	Pressure: 744 mmHg
1,800 (1,620-1,980)	1,800	1,764	1,764	Humidity: 28%
Parameter	Tolerance (±10%)	As Found	As Left	
Threshold T = 100	10 ± (9 to 11) mVDC	9.7	9.7	Geotropism: SAT ACK/Scroll: SAT
Threshold T = 500	50 ± (45 to 55) mVDC	48.4	48.4	BAT>4.5: SAT Volume: SAT
Threshold T = 1000	100 ± (90 to 110) mVDC	95.4	95.4	Count: SAT Audio Divide: SAT
Window Width W = 100	10 ± (9 to 11) mVDC	9.7	9.7	Alarms: SAT Lamp: SAT
Display-to-mV ratio:	*As Found Ratio 100 to 10 mV As Left Ratio 100 to 10 mV			Overload Test: SAT Physical cond: SAT
STATEMENT OF CERTIFICATION				
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).				
Instrument				
Calibrated By:	Reviewed By:	Date: 12/11/09		
Calibration Date: 12/01/2009		Calibration Due: 12/01/2010		

Ludlum 2350-1 #117555 Calibration Certificate



Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

CALIBRATION
CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION		
Customer Name: Duratek Inc. - Instrument Services Facility		Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2350-1	Serial Number: 117555	
Contact Name: Tony Riggs		Probe: N/A	Serial Number: N/A	
Customer Purchase Order Number: N/A	Work Order Number: 2009-10108	Calibration Method: Electronic and Source		
INSTRUMENT CALIBRATION INFORMATION				
Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments
		Before Calibration	After Calibration	
400	400	397	397	Pulser: 120935 Cal Due: 09/11/09
4,000	4,000	3,977	3,977	DVM: 88020324 Cal Due: 10/31/09
40,000	40,000	39,641	39,641	MC-250L: 8029 Cal Due: 08/26/09
400,000	400,000	396,771	396,771	Humidity: 958670 Cal Due: 04/22/09
HV Cal Values (M2350 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	EPPROM Version: 37122N21
600 (540-660)	600	601	601	Temp: 19.2 °C
1,200 (1,080-1,320)	1,200	1,189	1,189	Pressure: 736 mmHg
1,800 (1,620-1,980)	1,800	1,774	1,774	Humidity: 51%
Parameter	Tolerance (±10%)	As Found	As Left	
Threshold T = 100	10 ± (9 to 11) mVDC	10.6	10.6	Geotropism: SAT ACK/Scroll: SAT
Threshold T = 500	50 ± (45 to 55) mVDC	49.7	49.7	BAT>4.5: SAT Volume: SAT
Threshold T = 1000	100 ± (90 to 110) mVDC	100	100	Count: SAT Audio Divide: SAT
Window Width W = 100	10 ± (9 to 11) mVDC	10	10	Alarms: SAT Lamp: SAT
Display-to-mV ratio:	100 to 10 mV		Overload Test: SAT Physical cond: SAT	
STATEMENT OF CERTIFICATION				
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).				
Instrument				
Calibrated By: <i>M. Paul</i>		Reviewed By: <i>[Signature]</i>	Date: <i>4/21/09</i>	
Calibration Date: 04/21/2009		*Calibration Due (6mo): 10/21/2009 *Calibration Due (12mo): 04/21/2010		

* Calibration due date is dependant on users regulatory requirements.

Ludlum 177 #45602 with Ludlum 44-9 Probe #176080 Calibration Certificate



Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

CALIBRATION
CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				INSTRUMENT INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Road, Kingston, TN 37763				Model: 177	Serial Number: 45602
Contact Name: Tony Riggs				Probe: 44-9	Serial Number: 176080
Customer Purchase Order Number: N/A		Work Order Number: 2009-10385		Calibration Method: Electronic and Source	
INSTRUMENT CALIBRATION INFORMATION					
	Calibration Standard Value	Instrument Response ($\pm 10\%$)		Comments	
		Before Calibration	After Calibration	Calibrated in accordance with CP-IN-WI 223 Rev 1	
X 1	100	100	100	Pulser: 120935	Cal Due: 08/30/10
X 1	250	250	250	DVM: 88020324	Cal Due: 10/31/09
X 1	400	400	400	D-814: 2525	Cal Due: 12/10/09
X 10	1,000	1,000	1,000	Humidity: 992290	Cal Due: 02/03/10
X 10	2,500	2,500	2,500	Temp: 19.9 °C	Pressure: 742 mmHg Humidity: 44%
X 10	4,000	4,000	4,000		
X 100	10,000	10,000	10,000	Geotropism: SAT	F/S Resp: SAT
X 100	25,000	25,000	25,000	BAT: SAT	HV Test: SAT
X 100	40,000	40,000	40,000	Volume: SAT	Sensitivity: SAT
X 1000	100,000	100,000	100,000	Alarm Set: SAT	Reset: SAT
X 1000	250,000	250,000	250,000		
X 1000	400,000	400,000	400,000		
Mechanical Zero	0	0	0	Precision Test Reading 1: 2,600 Reading 2: 2,650 Reading 3: 2,600	
Efficiency Determination (Determined at ~1/8" with Model 180-2 Jig)				Mean: 2,617 <input checked="" type="checkbox"/> SAT <input type="checkbox"/> UNSAT	
Instrument Range	Source ID and Value	Net cpm	Efficiency		
EFF X1	Tc-99#119720 at 2,562dpm	310	12.1%		
EFF X10	Tc-99#119718 at 20,520dpm	2,560	12.5%	Background: 40cpm	
EFF X100	Tc-99#069507 at 237,960dpm	28,460	12.0%	Limited Use: X1K scale for information only. Use with GM probe.	
High Voltage	900V($\pm 5\%$)	900V	900V		
STATEMENT OF CERTIFICATION					
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).					
Instrument					
Calibrated By: M. Paul		Reviewed By: J. Robinson		Date: 10/1/09	
Calibration Date: 10/01/2009		Calibration Due: 10/01/2010			

Packard Tri-Carb #401663 Calibration Information

SYSTEM NORMALIZED

C14 IPA DATA PROCESSED - 25-Oct-2009 08:26
C14 Eff (0-156 keV) = 96.36 %
C14 CHI SQUARE IPA DATA PROCESSED - 25-Oct-2009 08:37
C14 Chi Square = 18.20
H3 IPA DATA PROCESSED - 25-Oct-2009 08:38
H3 Eff (0-18.6 keV) = 61.17 %
H3 CHI SQUARE IPA DATA PROCESSED - 25-Oct-2009 08:49
H3 Chi Square = 31.82
BKG IPA DATA PROCESSED - 25-Oct-2009 09:50
Bkg (0-18.6 keV) = 15.32 cpm
Bkg (0-156 keV) = 23.95 cpm

WARNING: Questionable C14 Background value - Please view historic data

C14 E²/B (1-156 keV) = 472.85
H3 E²/B (1-18.6 keV) = 244.91

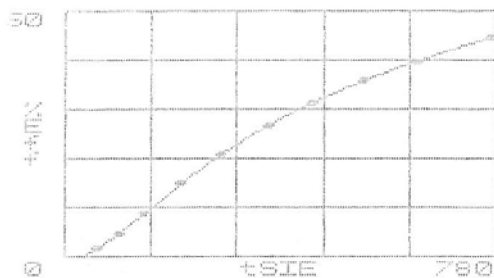
25 Oct 2009 06:22 ALPHA/BETA - 1.09 Page #1
Protocol #:13 H-3 Quench Stds User : EaglePicher / ES

Time: 30.00
Data Mode: Count Standards Nuclide: H-3 UG
Background Subtract: None

	LL	UL	LCR	2S%	BKG
Region A:	0.0 - 18.6	0	0.5	0.00	

Quench Indicator: tSIE/ACC
Ext Std Terminator: Count
ES# 060303 192,578 dpm
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal

P#	S#	TIME	CPMA	SIS	tSIE	FLAG
13	1	1.56	103061	16.001	772.73	S
13	2	1.75	91873.0	13.918	638.27	S
13	3	1.94	82602.1	12.505	539.42	S
13	4	2.22	72361.1	11.241	448.47	S
13	5	2.59	61910.2	10.058	369.15	S
13	6	3.35	47882.0	8.758	282.71	S
13	7	4.67	34284.2	7.705	210.27	S
13	8	8.05	19883.8	6.671	142.84	S
13	9	14.80	10813.9	5.883	98.931	S
13	10	30.00	3787.87	5.300	57.110	S



tSIE	%Eff
772.73	53.52
638.27	47.71
539.42	42.89
448.47	37.57
369.15	32.15
282.71	24.86
210.27	17.80
142.84	10.33
98.93	5.62
57.11	1.97

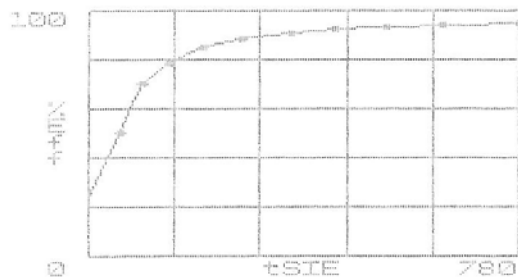
25 Oct 2009 07:50 ALPHA/BETA - 1.09 Page #1
Protocol #:26 C-14 Quench Stds User : EaglePicher / ES

Time: 30.00
Data Mode: Count Standards Nuclide: C-14 US
Background Subtract: None

LL UL LCR 25% BKG
Region A: 0.0 - 156 0 0.5 0.00

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
ES# 060302 138,100 dpm
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\EP\PROT.DAT
Count Data Filename: C:\EP\SDATA26.DAT

P#	PID	S#	TIME	CPMA	SIS	tSIE	FLAG
26	2	1	1.22	131264	124.79	777.84	S
26	2	2	1.24	129715	103.27	640.93	S
26	2	3	1.24	129133	88.280	542.43	S
26	2	4	1.26	127608	73.703	449.67	S
26	2	5	1.28	125367	61.226	367.62	S
26	2	6	1.31	122180	47.084	278.49	S
26	2	7	1.37	117336	36.194	208.85	S
26	2	8	1.48	108250	26.653	145.63	S
26	2	9	1.67	96137.1	19.439	98.834	S
26	2	10	2.31	69347.7	12.716	57.617	S



tSIE	%Eff
777.84	95.05
640.93	93.93
542.43	93.51
449.67	92.40
367.62	90.78
278.49	88.47
208.85	84.96
145.63	78.39
98.83	69.61
57.62	50.22

Attachment 7.3: Beta Instrument Static and Scan MDC Worksheets

Static and Scan MDC Worksheet for
43-68 Gas Flow Proportional Detectors

Static MDC (43-68)	
$MDC_{beta} = \frac{2.71}{t_s} + 3.29 * \sqrt{\left(\frac{R_b}{t_s} + \frac{R_b}{t_b} \right) \frac{A}{\epsilon_i * \epsilon_s * 100}}$	
CS-FO-PR-001 Rev. 1, Section 4.8.1.2	

Scan MDC (43-68)	
$MDC_{Scan} = \frac{d * \sqrt{b_i} * \frac{60}{i}}{\sqrt{p * \epsilon_i * \epsilon_s * \frac{A}{100}}}$	
CS-FO-PR-001 Rev. 1, Section 4.8.3.3 to 4.8.3.5	

Inputs	
INST#	80502
DET#	95523
R _B	265
t _B	1
t _S	1
A	126
ε _{4π}	0.143
BS	0.05
ε _i	0.272
ε _s	0.25
S _e	1.00

Inputs	
INST#	80502
DET#	95523
d'	1.38
p	0.50
Scan ε _i	0.25
Scan ε _s	0.25
S _e	1.00

43-68

Scan Speed	8.8	(cm/sec)
R _B	265	Background Count Rate (cpm)
b _i	4.416667	Background counts per observation interval
Detector Width	8.8	width of detector in direction of scan (cm)
A	126	Area of Detector (cm ²)

Outputs		
43-68		
ε _t	0.0613	Total Detection Efficiency
i	1.00	Observation interval in seconds (detector width divided by the scan speed)
Scan MDC	3,187	dpm/100 cm ²

Outputs		
ε _t	0.0681	Total Detection Efficiency
MDC	914	dpm/100 cm ²
Enter data		
Formula, enter 2π efficiency data directly if available		
Change if necessary		

Reviewed by: Paul C. Ely

Date: 10/22/09

Static and Scan MDC Worksheet for
43-68 Gas Flow Proportional Detectors

Static MDC (43-68)

$$MDC_{beta} = \frac{2.71}{t_s} + 3.29 * \sqrt{\left(\frac{R_b}{t_s} + \frac{R_b}{t_b} \right)}$$

$$\varepsilon_i * \varepsilon_s * \frac{A}{100}$$

CS-FO-PR-001 Rev. 1, Section 4.8.1.2

Scan MDC (43-68)

$$MDC_{Scan} = \frac{d' * \sqrt{b_i} * \frac{60}{i}}{\sqrt{p} * \varepsilon_i * \varepsilon_s * \frac{A}{100}}$$

CS-FO-PR-001 Rev. 1, Section 4.8.3.3 to 4.8.3.5

Inputs	
INST#	95359
DET#	119337
R _b	282.1
t _b	1
t _s	1
A	126
ε _i	0.197
BS	0.05
ε _i	0.375
ε _s	0.25
S _c	1.00
source efficiency (radionuclide detectability)	

Inputs	
INST#	95359
DET#	119337
d'	1.38
p	0.50
Scan ε _i	0.34
Scan ε _s	0.25
S _c	1.00
source efficiency (radionuclide detectability)	
43-68	
Scan Speed	8.8 (cm/sec)
R _b	282.1
b _i	4.701667
Detector Width	8.8
A	126
Area of Detector (cm ²)	
Outputs	
43-68	
ε _i	0.0844
i	1.00
Scan MDC	2,387
dpm/100 cm ²	

Outputs

ε_i = 0.0938 Total Detection Efficiency

MDC = 684 dpm/100 cm²

Enter data

Formula, enter 2π efficiency data directly if available

Change if necessary

Reviewed by: Paul Eg Date: 12/30/09

Static and Scan MDC Worksheet for
43-68 Gas Flow Proportional Detectors

Static MDC (43-68)

$$MDC_{beta} = \frac{\frac{2.71}{t_s} + 3.29 * \sqrt{\left(\frac{R_b}{t_s} + \frac{R_b}{t_b}\right)}}{\epsilon_i * \epsilon_s * \frac{A}{100}}$$

CS-FO-PR-001 Rev. 1, Section 4.8.1.2

Scan MDC (43-68)

$$MDC_{Scan} = \frac{d' * \sqrt{b_i} * \frac{60}{i}}{\sqrt{p} * \epsilon_i * \epsilon_s * \frac{A}{100}}$$

CS-FO-PR-001 Rev. 1, Section 4.8.3.3 to 4.8.3.5

Inputs	
INST# =	117566
DET# =	91028
R _b =	262.1
t _b =	1
t _s =	1
A =	126
ε _{4π} =	0.157
BS =	0.05
ε _d =	0.299
ε _s =	0.25
S _e =	1.00
source efficiency (radionuclide detectability)	

Inputs	
INST# =	117566
DET# =	91028
d' =	1.38
p =	0.50
Scan ε _i =	0.27
Scan ε _s =	0.25
S _e =	1.00
source efficiency (radionuclide detectability)	
43-68	
Scan Speed =	8.8 (cm/sec)
R _b =	262.1
b _i =	4.368333
Detector Width =	8.8
A =	126
Area of Detector (cm ²)	
Outputs	
43-68	
ε _t =	0.0673
i =	1.00
Observation interval in seconds (detector width divided by the scan speed)	
Scan MDC =	2.887
dpm/100 cm ²	

Outputs	
ε _t =	0.0748
MDC =	828
Enter data	
Formula, enter 2π efficiency data directly if available	
Change if necessary	

Reviewed by: Paul C. Ely

Date: 12/30/09

Static and Scan MDC Worksheet for
43-68 Gas Flow Proportional Detectors

Static MDC (43-68)

$$MDC_{beta} = \frac{2.71}{t_s} + 3.29 * \sqrt{\left(\frac{R_b}{t_s} + \frac{R_b}{t_b} \right)} \frac{A}{\epsilon_i * \epsilon_s * 100}$$

CS-FO-PR-001 Rev. 1, Section 4.8.1.2

Scan MDC (43-68)

$$MDC_{Scan} = \frac{d' * \sqrt{b_i} * 60}{\sqrt{p * \epsilon_i * \epsilon_s} * \frac{A}{100}}$$

CS-FO-PR-001 Rev. 1, Section 4.8.3.3 to 4.8.3.5

Inputs	
INST# =	117566 Instrument Serial Number
DET# =	134489 Detector Serial Number
R _b =	368 Background Count Rate (cpm)
t _b =	1 Background Count Time (min)
t _s =	1 Sample Count Time (min)
A =	126 Area of Detector (cm ²)
ε _i =	0.159 Detector Efficiency (4π)
BS =	0.05 Backscatter
ε _i =	0.303 Detector Efficiency (2π)
ε _s =	0.25 Surface Efficiency
S _c =	1.00 source efficiency (radionuclide detectability)

Inputs	
INST# =	117566 Instrument Serial Number
DET# =	134489 Detector Serial Number
d' =	1.38 Index of Sensitivity
p =	0.50 Surveyor Efficiency
Scan ε _i =	0.27 Scanning Instrument Efficiency (2π)
Scan ε _s =	0.25 Scanning Surface Efficiency
S _c =	1.00 source efficiency (radionuclide detectability)
43-68	
Scan Speed =	8.8 (cm/sec)
R _b =	368 Background Count Rate (cpm)
b _i =	6.133333 Background counts per observation interval
Detector Width =	8.8 width of detector in direction of scan (cm)
A =	126 Area of Detector (cm ²)
Outputs	
43-68	
ε _t =	0.0681 Total Detection Efficiency
i =	1.00 Observation interval in seconds (detector width divided by the scan speed)
Scan MDC =	3.378 dpm/100 cm ²

Outputs	
ε _t =	0.0757 Total Detection Efficiency
MDC =	964 dpm/100 cm ²
Enter data	
Formula, enter 2π efficiency data directly if available	
Change if necessary	

Reviewed by: Paul Ely
Date: 12/30/09

Static and Scan MDC Worksheet for
43-68 Gas Flow Proportional Detectors

Static MDC (43-68)		Scan MDC (43-68)	
$MDC_{beta} = \frac{2.71}{t_s} + 3.29 * \sqrt{\left(\frac{R_b}{t_s} + \frac{R_b}{t_b} \right) \frac{A}{\epsilon_i * \epsilon_s * 100}}$ <p>CS-FO-PR-001 Rev 1, Section 4.8.1.2</p>		$MDC_{Scan} = \frac{d' * \sqrt{b_i} * \frac{60}{i}}{\sqrt{p * \epsilon_i * \epsilon_s} * \frac{A}{100}}$ <p>CS-FO-PR-001 Rev 1, Section 4.8.3.3 to 4.8.3.5</p>	

Inputs		Inputs	
INST# =	126198	Instrument Serial Number	126198
DET# =	75149	Detector Serial Number	75149
R _b =	335	d' =	1.38
t _b =	1	p =	0.50
t _s =	1	Scan ε _i =	0.25
A =	126	Scan ε _s =	0.25
ε _{4π} =	0.143	S _c =	1.00
BS =	0.05	source efficiency (radionuclide detectability)	
ε _i =	0.272	43-68	
ε _s =	0.25	Scan Speed =	8.8 (cm/sec)
S _c =	1.00	R _g =	335
source efficiency (radionuclide detectability)		b _i =	5.583333
		Detector Width =	8.8
		A =	126
		Area of Detector (cm ²)	
Outputs		Outputs	
ε _i =	0.0681	43-68	
MDC =	1.024	Total Detection Efficiency	
Enter data		Observation interval in seconds (detector width divided by the scan speed)	
Formula, enter 2π efficiency data directly if available		dpm/100 cm ²	
Change if necessary		Scan MDC = 3.583	

Date: 12/30/09

Reviewed by: Paul Ely

Attachment 7.4: COMPASS Survey Plans and Survey Location Calculations

SU001 West Building

COMPASS Report

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BUILDING SURFACE SURVEY PLAN

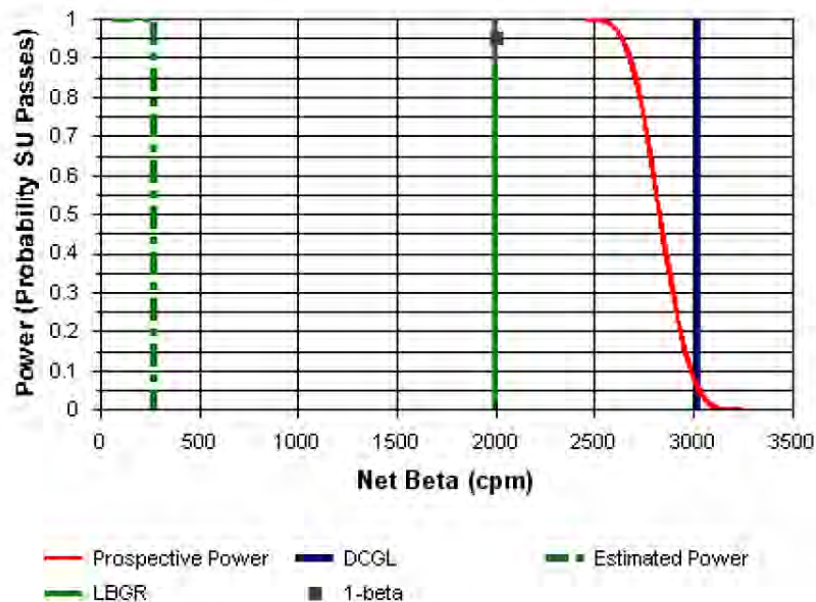
Survey Plan Summary

Site Name: EaglePicher
Planner(s): P Ely
Survey Unit Name: SU001 Interior West Area
Comments: N/A

Statistical Design Details

Area (m ²):	858	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm ²):	348
DCGL (cpm/100 cm ²):	3,024	Sample Size (N):	14
LBGR (cpm/100 cm ²):	2,000	Estimated Conc. (cpm/100 cm ²):	273
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



COMPASS Report

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Gross Beta Efficiency Data

Instrument Description: Ludlum 43-68 with 1 Layer Mylar (0.4 mg)
Physical Detector Area (cm²): 126
DCGLw (dpm/100 cm²): 60,000
Total Efficiency: 0.04
DCGLw (cpm/100 cm²): 3,024

Contaminant	HTDC ^a	Energy ^b	Fract ^c	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	No	49.47	1.0	0.14	0.25	0.04

^aHard-to-detect contaminant ^bAverage beta energy (keV) [N/A indicates alpha emission] ^cActivity fraction

Gross Beta Mean and Sigma Data

Count Time (min): 1
Sign Test Sigma (cpm/100 cm²): 348

Data/Material	Mean (cpm/100 cm ²)	Std. Dev. (cpm/100 cm ²)	MDC (dpm/100 cm ²)
SU	273	348	1,584

Report Created 09/24/2009 1037 (COMPASS v1.1.0)

**Survey Package 001
Interior Areas Class 3**

Total Floor Grids: 869
Floor Survey Points: 40
Ceiling Survey Points: 40 Ceiling locations above floor locations
Wall Survey Points: 40 Wall grid locations were made on the wall nearest to the floor location

Floor/Ceiling Location	
Grid Number	X (n)
1	1
2	18
3	50
4	81
5	120
6	125
7	143
8	168
9	193
10	199
11	213
12	237
13	242
14	272
15	289
16	299
17	304
18	305
19	328
20	329
21	339
22	403
23	431
24	477
25	502
26	570
27	597
28	607
29	614
30	628
31	637
32	664
33	687
34	693
35	709
36	733
37	735
38	777
39	856
40	860

Location X(n) indicates the grid number and Y indicates the elevation above the floor for walls.

Note random survey locations have been sorted to place survey locations in an ordered sequence.

SU002 East Building

COMPASS Report

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BUILDING SURFACE SURVEY PLAN

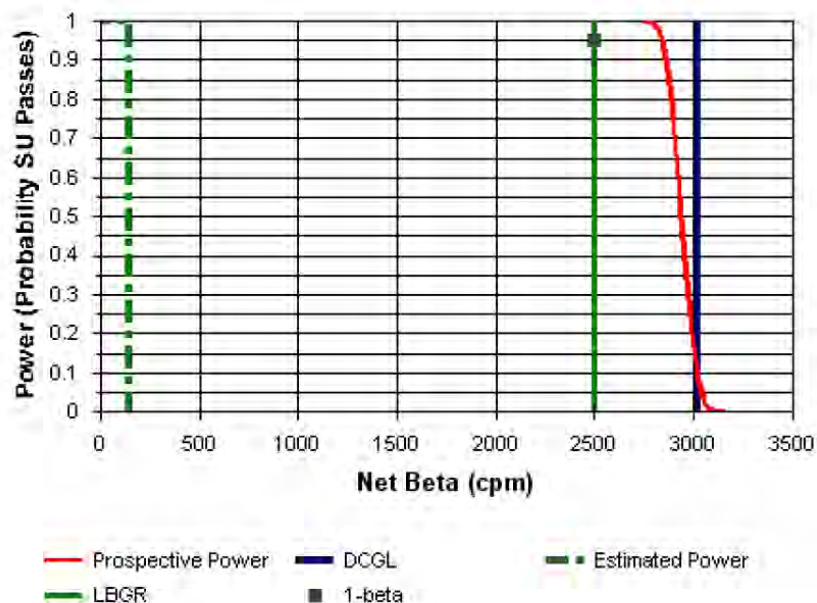
Survey Plan Summary

Site Name: EaglePicher
Planner(s): P Ely
Survey Unit Name: SU002 Interior East Area
Comments: N/A

Statistical Design Details

Area (m ²):	684	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm ²):	173
DCGL (cpm/100 cm ²):	3,024	Sample Size (N):	13
LBGR (cpm/100 cm ²):	2,500	Estimated Conc. (cpm/100 cm ²):	144
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



COMPASS Report

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Gross Beta Efficiency Data

Instrument Description: Ludlum 43-68 with 1 Layer Mylar (0.4 mg)
Physical Detector Area (cm²): 126
DCGLw (dpm/100 cm²): 60,000
Total Efficiency: 0.04
DCGLw (cpm/100 cm²): 3,024

Contaminant	HTDC ^a	Energy ^b	Fract ^c	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	No	49.47	1.0	0.14	0.25	0.04

^aHard-to-detect contaminant ^bAverage beta energy (keV) [N/A indicates alpha emission] ^cActivity fraction

Gross Beta Mean and Sigma Data

Count Time (min): 1
Sign Test Sigma (cpm/100 cm²): 173

Data/Material	Mean (cpm/100 cm ²)	Std. Dev. (cpm/100 cm ²)	MDC (dpm/100 cm ²)
SU	144	173	1,167

Report Created 09/24/2009 1023 (COMPASS v1.1.0)

Survey Package 002
Interior Areas Class 3

Total Floor Grids: 683
Floor Survey Points: 40
Ceiling Survey Points: 40
Wall Survey Points: 40

Ceiling locations above floor locations
Wall grid locations were made on the wall
nearest to the floor location

Floor/Ceiling Location	
Grid Number	X (n)
1	15
2	50
3	68
4	92
5	117
6	120
7	134
8	141
9	153
10	155
11	161
12	168
13	174
14	177
15	193
16	247
17	257
18	277
19	310
20	319
21	332
22	370
23	381
24	391
25	400
26	436
27	452
28	457
29	489
30	490
31	522
32	529
33	562
34	573
35	583
36	587
37	593
38	621
39	642
40	674

Location X(n) indicates the grid number and Y indicates the elevation above the floor for walls.

Note random survey locations have been sorted to place survey locations in an ordered sequence.

SU003 Outside Wall

COMPASS Report

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BUILDING SURFACE SURVEY PLAN

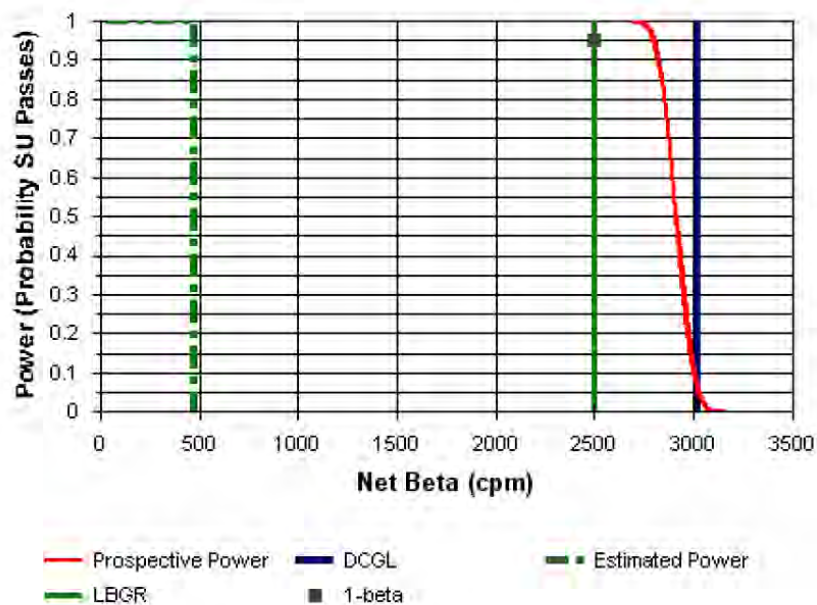
Survey Plan Summary

Site Name: EaglePicher
Planner(s): P Ely
Survey Unit Name: SU003 Exterior Walls
Comments: N/A

Statistical Design Details

Area (m ²):	1,484	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm ²):	202
DCGL (cpm/100 cm ²):	3,024	Sample Size (N):	14
LBGR (cpm/100 cm ²):	2,500	Estimated Conc. (cpm/100 cm ²):	476
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



COMPASS Report

Page 2 of 2

Gross Beta Efficiency Data

Instrument Description: Lundlum 43-68 with 1 Layer Mylar (0.4 mg)
Physical Detector Area (cm²): 126
DCGLw (dpm/100 cm²): 60,000
Total Efficiency: 0.04
DCGLw (cpm/100 cm²): 3,024

Contaminant	HTDC ^a	Energy ^b	Fract ^c	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	No	49.47	1.0	0.14	0.25	0.04

^aHard-to-detect contaminant ^bAverage beta energy (keV) [N/A indicates alpha emission] ^cActivity fraction

Gross Beta Mean and Sigma Data

Count Time (min): 1
Sign Test Sigma (cpm/100 cm²): 202

Data/Material	Mean (cpm/100 cm ²)	Std. Dev. (cpm/100 cm ²)	MDC (dpm/100 cm ²)
SU	476	202	2,072

Report Created 09/24/2009 1059 (COMPASS v1.1.0)

Survey Package 003
Building Class 3 Exterior Walls
(Random Survey Locations)
X (Distance along wall) 264 meters

Survey Point	Survey Location		
	X (m)	Y (m)	
1	6	4.0	
2	11	4.2	
3	14	3.4	
4	19	6.9	South Wall 8m
5	21	5.6	
6	24	6.2	
7	29	6.2	
8	45	0.8	
9	48	1.4	
10	52	0.1	South Wall 4.5m
11	54	1.6	
12	68	1.3	
13	76	2.3	South Brick Screen Wall 3.2m
14	84	1.9	
15	108	1.8	East Wall @ High Roof 3.3m
16	112	2.5	
17	125	1.0	
18	127	2.5	
19	140	2.3	East Wall 4.5m
20	165	4.4	
21	167	0.8	
22	173	0.3	
23	182	0.4	North Wall 4.5m
24	189	1.9	
25	189	2.2	
26	192	1.2	
27	200	2.1	
28	203	7.1	
29	209	2.3	North Wall 8m
30	212	1.2	
31	215	2.1	
32	224	6.3	
33	225	1.9	
34	227	6.3	
35	231	2.7	
36	233	7.3	West Wall 8m
37	247	1.9	
38	248	2.0	
39	256	2.8	
40	262	5.6	

Wall locations start a SW Corner at ground level. X indicates the distance around the building counter clockwise and Y indicates the elevation above ground.

Note random survey locations have been sorted to place survey locations in an ordered sequence.

SU004 High Roof

COMPASS Report

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BUILDING SURFACE SURVEY PLAN

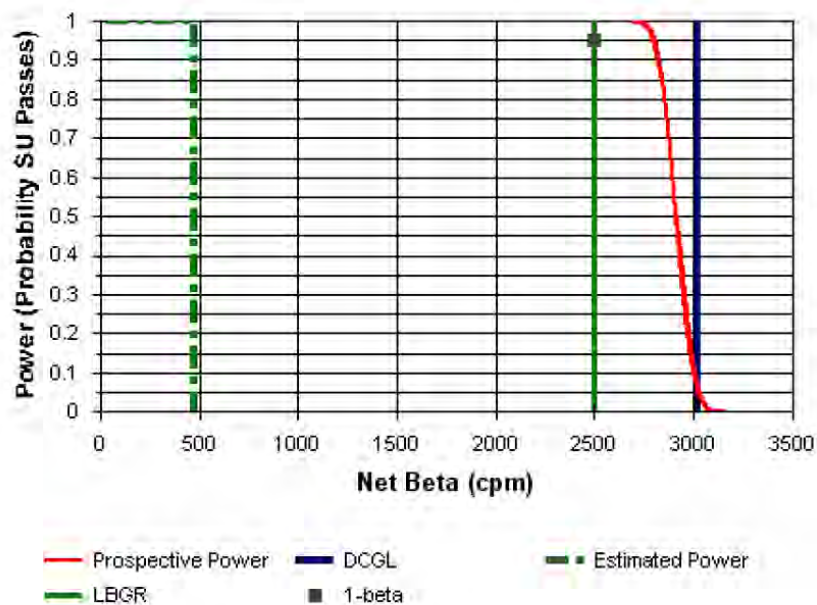
Survey Plan Summary

Site Name: EaglePicher
Planner(s): P Ely
Survey Unit Name: SU004 High Roof
Comments: N/A

Statistical Design Details

Area (m ²):	915	Classification:	2
Selected Test:	Sign	Estimated Sigma (cpm/100 cm ²):	202
DCGL (cpm/100 cm ²):	3,024	Sample Size (N):	14
LBGR (cpm/100 cm ²):	2,500	Estimated Conc. (cpm/100 cm ²):	476
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



COMPASS Report

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Gross Beta Efficiency Data

Instrument Description: Ludlum 43-68 with 1 Layer Mylar (0.4 mg)
Physical Detector Area (cm²): 126
DCGLw (dpm/100 cm²): 60,000
Total Efficiency: 0.04
DCGLw (cpm/100 cm²): 3,024

Contaminant	HTDC ^a	Energy ^b	Fract ^c	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	No	49.47	1.0	0.14	0.25	0.04

^aHard-to-detect contaminant ^bAverage beta energy (keV) [N/A indicates alpha emission] ^cActivity fraction

Gross Beta Mean and Sigma Data

Count Time (min): 1
Sign Test Sigma (cpm/100 cm²): 202

Data/Material	Mean (cpm/100 cm ²)	Std. Dev. (cpm/100 cm ²)	MDC (dpm/100 cm ²)
SU	476	202	2,072

Report Created 09/24/2009 1127 (COMPASS v1.1.0)

Survey Package 004
High Roof
Roof Class 2 Area

X (Max): 23.5 meters
Y (Max): 42.16 meters
A (Area): 991 m²
Actual Survey Area: 914.6 m²
Required Survey Points: 30 8% percent void area
N (Points): 32 32 Estimated Minimum Points

$$L = \left[\frac{A}{N} \right]^{1/2}$$

for square grid

L= 5.6 meters (distance between measurement points)

X (Origin): 21.6 initially generated random number
Y (Origin): 2.0 initially generated random number

Number of rows: 8
Number of columns: 4

Survey Point	Survey Location		Row
	X	Y	
Starting Point (1)	21.6	2.0	1
2	16.0	2.0	
3	10.4	2.0	
4	4.8	2.0	
5	21.6	7.6	2
6	16.0	7.6	
7	10.4	7.6	
8	4.8	7.6	
9	21.6	13.2	3
10	16.0	13.2	
11	10.4	13.2	
12	4.8	13.2	
13	21.6	18.8	4
14	16.0	18.8	
15	10.4	18.8	
16	4.8	18.8	
17	21.6	24.4	5
18	16.0	24.4	
19	10.4	24.4	
20	4.8	24.4	
21	21.6	30.0	6
22	16.0	30.0	
23	10.4	30.0	
24	4.8	30.0	
25	21.6	35.6	7
26	16.0	35.6	
27	10.4	35.6	
28	4.8	35.6	
29	21.6	41.2	8
30	16.0	41.2	
31	10.4	41.2	
32	4.8	41.2	

SU005 Low Roof

COMPASS Report

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BUILDING SURFACE SURVEY PLAN

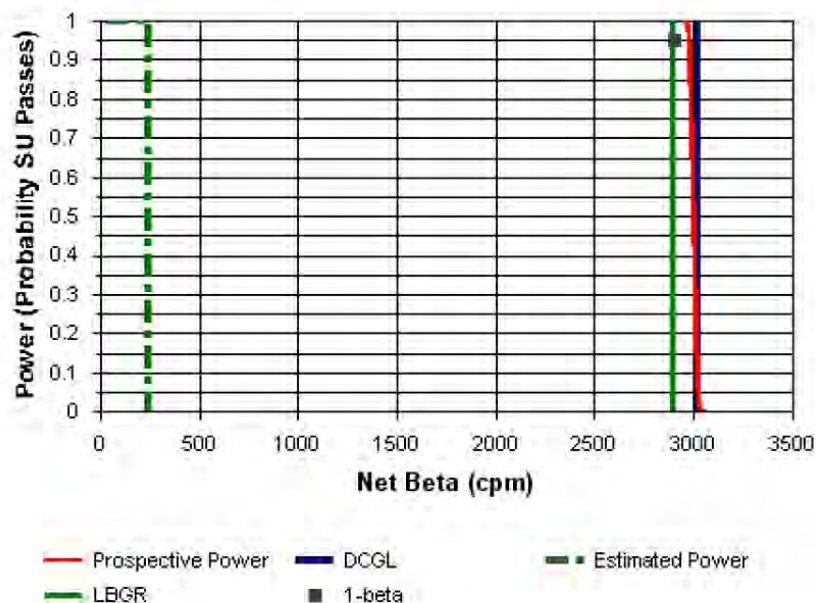
Survey Plan Summary

Site Name: EaglePicher
Planner(s): P Ely
Survey Unit Name: SU005 Low Roof
Comments: N/A

Statistical Design Details

Area (m ²):	1,376	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm ²):	42
DCGL (cpm/100 cm ²):	3,024	Sample Size (N):	14
LBGR (cpm/100 cm ²):	2,900	Estimated Conc. (cpm/100 cm ²):	244
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



COMPASS Report

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Gross Beta Efficiency Data

Instrument Description: Ludlum 43-68 with 1 Layer Mylar (0.4 mg)
Physical Detector Area (cm²): 126
DCGLw (dpm/100 cm²): 60,000
Total Efficiency: 0.04
DCGLw (cpm/100 cm²): 3,024

Contaminant	HTDC ^a	Energy ^b	Fract ^c	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	No	49.47	1.0	0.14	0.25	0.04

^aHard-to-detect contaminant ^bAverage beta energy (keV) [N/A indicates alpha emission] ^cActivity fraction

Gross Beta Mean and Sigma Data

Count Time (min): 1
Sign Test Sigma (cpm/100 cm²): 42

Data/Material	Mean (cpm/100 cm ²)	Std. Dev. (cpm/100 cm ²)	MDC (dpm/100 cm ²)
SU	244	42	1,501

Report Created 09/24/2009 1301 (COMPASS v1.1.0)

Survey Package 005

Low Roof

Roof Class 3 Area

X (East:West) 118 feet

Y (North:South) 119 feet

(RANDOM LOCATIONS SORTED)

Survey Point	Survey Location	
	X (ft)	Y (ft)
1	6	110
2	10	14
3	16	103
4	20	33
5	22	78
6	24	111
7	27	110
8	28	65
9	28	104
10	29	55
11	30	114
12	32	16
13	35	99
14	37	104
15	38	82
16	39	105
17	43	68
18	47	51
19	52	102
20	58	43
21	66	49
22	68	13
23	71	113
24	72	37
25	79	21
26	93	61
27	95	33
28	109	104
29	113	6
30	117	3

Location X indicates the East:West location and Y indicates the North:South location relative to the southwest corner.

Note random survey locations have been sorted to place survey locations in an ordered sequence.

SU006 Mezzanine Ceiling

COMPASS Report

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BUILDING SURFACE SURVEY PLAN

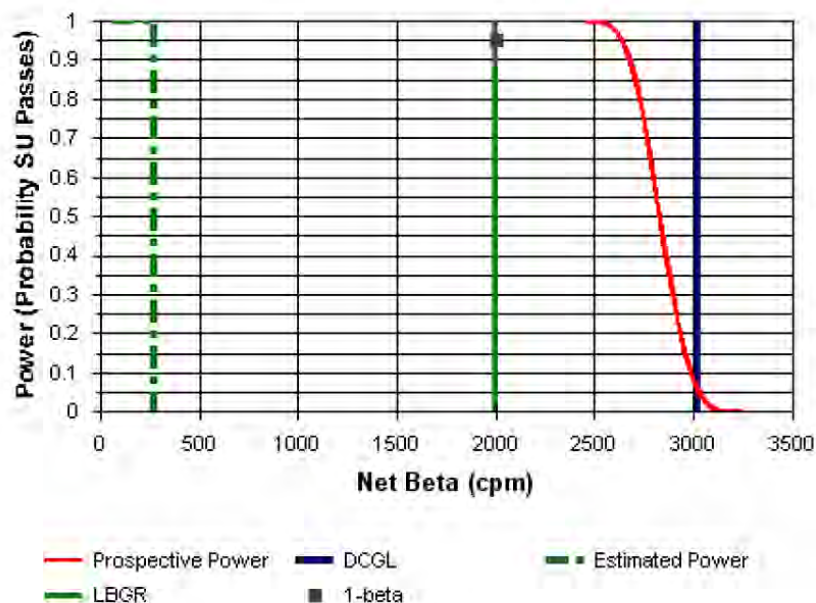
Survey Plan Summary

Site Name: EaglePicher
Planner(s): P Ely
Survey Unit Name: SU006 Ceiling Above Cell Block
Comments: N/A

Statistical Design Details

Area (m ²):	614	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm ²):	348
DCGL (cpm/100 cm ²):	3,024	Sample Size (N):	14
LBGR (cpm/100 cm ²):	2,000	Estimated Conc. (cpm/100 cm ²):	273
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



COMPASS Report

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Gross Beta Efficiency Data

Instrument Description: Ludlum 43-68 with 1 Layer Mylar (0.4 mg)
Physical Detector Area (cm²): 126
DCGLw (dpm/100 cm²): 60,000
Total Efficiency: 0.04
DCGLw (cpm/100 cm²): 3,024

Contaminant	HTDC ^a	Energy ^b	Fract ^c	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	No	49.47	1.0	0.14	0.25	0.04

^aHard-to-detect contaminant ^bAverage beta energy (keV) [N/A indicates alpha emission] ^cActivity fraction

Gross Beta Mean and Sigma Data

Count Time (min): 1
Sign Test Sigma (cpm/100 cm²): 348

Data/Material	Mean (cpm/100 cm ²)	Std. Dev. (cpm/100 cm ²)	MDC (dpm/100 cm ²)
SU	273	348	1,584

Report Created 09/24/2009 1316 (COMPASS v1.1.0)

**Survey Package 006
Ceiling Above Labs
Ceiling Class 3 Area**

X (East:West) 70.5 feet
Y (North:South) 101 feet

(RANDOM LOCATIONS SORTED)

Survey Point	Survey Location	
	X (ft)	Y (ft)
1	1	19
2	2	75
3	3	19
4	7	14
5	8	69
6	14	18
7	16	17
8	16	29
9	18	72
10	19	73
11	20	42
12	20	83
13	22	31
14	28	23
15	32	13
16	32	98
17	34	34
18	35	49
19	37	96
20	42	30
21	46	34
22	49	63
23	52	4
24	52	53
25	55	3
26	57	82
27	59	18
28	61	49
29	61	68
30	65	81

Location X indicates the East:West location and Y indicates the North:South location relative to the southwest corner.

Note random survey locations have been sorted to place survey locations in an ordered sequence.

SU007 Out Building

COMPASS Report

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BUILDING SURFACE SURVEY PLAN

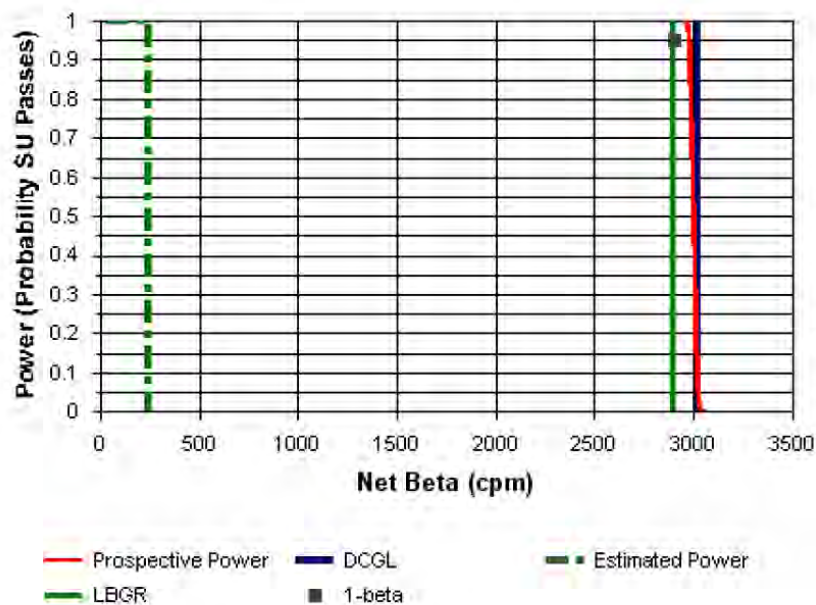
Survey Plan Summary

Site Name: EaglePicher
Planner(s): P Ely
Survey Unit Name: SU007 Out Buildings
Comments: N/A

Statistical Design Details

Area (m ²):	413	Classification:	3
Selected Test:	Sign	Estimated Sigma (cpm/100 cm ²):	42
DCGL (cpm/100 cm ²):	3,024	Sample Size (N):	14
LBGR (cpm/100 cm ²):	2,900	Estimated Conc. (cpm/100 cm ²):	244
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



COMPASS Report

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Gross Beta Efficiency Data

Instrument Description: Ludlum 43-68 with 1 Layer Mylar (0.4mg)
Physical Detector Area (cm²): 126
DCGLw (dpm/100 cm²): 60,000
Total Efficiency: 0.04
DCGLw (cpm/100 cm²): 3,024

Contaminant	HTDC ^a	Energy ^b	Fract ^c	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	No	49.47	1.0	0.14	0.25	0.04

^aHard-to-detect contaminant ^bAverage beta energy (keV) [N/A indicates alpha emission] ^cActivity fraction

Gross Beta Mean and Sigma Data

Count Time (min): 1
Sign Test Sigma (cpm/100 cm²): 42

Data/Material	Mean (cpm/100 cm ²)	Std. Dev. (cpm/100 cm ²)	MDC (dpm/100 cm ²)
SU	244	42	1,501

Report Created 09/30/2009 07:56 (COMPASS v1.1.0)

Survey Package 007
Out Building
Class 3 Area

X (Distance) 190 feet
Y (Distance or Elevation) 15 feet

(RANDOM LOCATIONS SORTED)

Survey Point	Survey Location	
	X (ft)	Y (ft)
1	3	7
2	5	1
3	7	14
4	11	7
5	12	11
6	19	1
7	19	3
8	23	3
9	30	4
10	37	4
11	37	12
12	46	12
13	47	11
14	49	5
15	51	15
16	56	1
17	99	4
18	104	11
19	113	2
20	120	5
21	124	12
22	133	13
23	134	6
24	139	1
25	143	9
26	144	7
27	148	3
28	148	10
29	159	12
30	162	3
31	173	8
32	177	9
33	177	10
34	189	9

Location X indicates the lineal distance relative to the southwest corner (see map).

Note random survey locations have been sorted to place survey locations in an ordered sequence.

SU009 Soil Areas

COMPASS Report

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SURFACE SOIL SURVEY PLAN

Survey Plan Summary

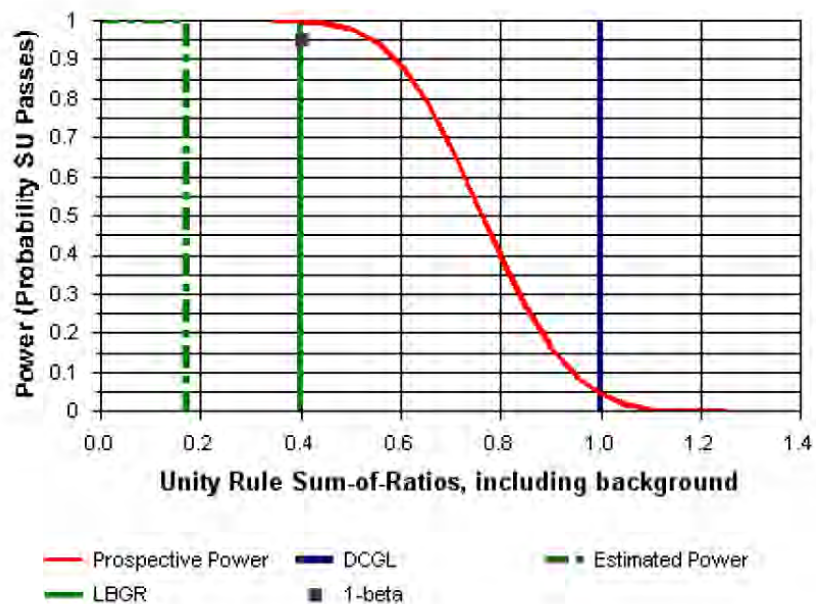
Site Name: EaglePicher Soil
Planner(s): P Ely
Survey Unit Name: SU009 Surface Soil Sampling
Comments: N/A

Statistical Design Details

Area (m ²):	22,874	Classification:	3
Selected Test:	Sign	Estimated Sigma (SOR):	0.50
DCGL (SOR):	1	Sample Size (N):	22
LBGR (SOR):	0.40	Estimated Conc. (SOR):	0.17
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

NOTE: SOR = Sum-of-Ratios

Prospective Power Curve



COMPASS Report

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Measured Contaminant Details

Contaminant	DCGLw (pCi/g)	Modified DCGLw (pCi/g)	Survey Unit Estimate (Mean \pm 1-Sigma) (pCi/g)	Reference Area Estimate (Mean \pm 1-Sigma) (pCi/g)
C-14	60	N/A	9.9 \pm 30	1.5 \pm 1.5
H-3	2,100	N/A	6.8 \pm 30	0.08 \pm 0.26

Report Created 09/25/2009 1026 (COMPASS v1.1.0)

Survey Package 009

Entire Site

Class 3 Area

X (East:West) 741 feet
Y (North:South) 395 feet
Total Area 292,695 ft²
Real Area 246,212 ft²
% Real Area 84%
Sample Points 36

(RANDOM LOCATIONS SORTED)

Survey Point	Survey Location	
	X (ft)	Y (ft)
1	3	49
2	90	357
3	97	46
4	103	226
5	112	202
6	172	212
7	188	156
8	190	67
9	232	121
10	233	62
11	234	309
12	240	1
13	244	216
14	274	322
15	309	214
16	312	112
17	314	279
18	328	176
19	328	346
20	329	294
21	340	259
22	361	328
23	371	126
24	384	142
25	397	260
26	427	354
27	429	240
28	432	116
29	464	212
30	483	20
31	513	116
32	569	325
33	582	253
34	606	97
35	641	98
36	733	106

Location X indicates the East:West location and Y indicates the North:South location relative to the southwest corner.

Note random survey locations have been sorted to place survey locations in an ordered sequence.

SU010 Mechanical Room Floor

COMPASS Report

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BUILDING SURFACE SURVEY PLAN

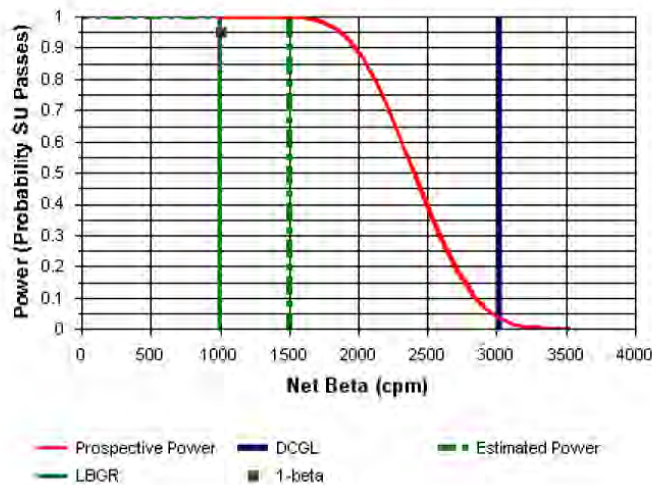
Survey Plan Summary

Site Name: EaglePicher
Planner(s): P Ely
Survey Unit Name: SU010 Mechanical Room
Comments: Area Reclassified

Statistical Design Details

Area (m ²):	114	Classification:	1
Selected Test:	Sign	Estimated Sigma (cpm/100 cm ²):	1,000
DCGL (cpm/100 cm ²):	3,024	Sample Size (N):	15
LBGR (cpm/100 cm ²):	1,000	Estimated Conc. (cpm/100 cm ²):	1,500
Alpha:	0.050	Estimated Power:	1.00
Beta:	0.050	Post-EMC Sample Size (N):	15

Prospective Power Curve



COMPASS Report

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Gross Beta Efficiency Data

Instrument Description: Ludlum 43-68 with 1 Layer Mylar (0.4 mg)
Physical Detector Area (cm²): 126
DCGLw (dpm/100 cm²): 60,000
Total Efficiency: 0.04
DCGLw (cpm/100 cm²): 3,024

Contaminant	HTDC ^a	Energy ^b	Fract ^c	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	No	49.47	1.0	0.14	0.25	0.04

^aHard-to-detect contaminant ^bAverage beta energy (keV) [N/A indicates alpha emission] ^cActivity fraction

Gross Beta Mean and Sigma Data

Count Time (min): 1
Sign Test Sigma (cpm/100 cm²): 1,000

Data/Material	Mean (cpm/100 cm ²)	Std. Dev. (cpm/100 cm ²)	MDC (dpm/100 cm ²)
SU	1,500	1,000	3,633

Elevated Measurement Comparison (EMC) for Gross Beta

Scanning Instrumentation Description: Ludlum 43-68 with 1 Layer Mylar (0.4 mg)
Background (cpm/100 cm²): 325
Total Scanning Efficiency: 0.04
True Positive Proportion: 0.85
False Positive Proportion: 0.6
Index of Sensitivity (d'): 0.82
Observation Interval (sec): 1.0
Surveyor Efficiency: 0.50
Area Factor Table Interpolation Method: Linear

Statistical Design

N: 15
Bounded Area (m²): 7.6
Area Factor:
DCGLw*:
Scan MDC Required*:

Hot Spot Design

Actual Scan MDC*: 4,048
Area Factor: N/A
Bounded Area (m²): N/A
Post-EMC N: 15

Contaminant	Energy ^a	Fract ^b	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	49.47	1.0	0.14	0.25	0.04

^aAverage beta energy (keV) [N/A indicates alpha emission] ^bActivity fraction

Report Created 11/11/2009 1216 (COMPASS v1.1.0)

Survey Package 010
Mechanical Room
Floor Class 1 Area

X (Max): 14.6 meters
Y (Max): 9.7 meters
A (Area): 142 m²
Actual Survey Area: 112.0 m²
Required Survey Points: 15 21% percent void area
N (Points): 24 19 Estimated Minimum Points

$$L = \left[\frac{A}{N} \right]^{1/2}$$

for square grid

L= 2.4 meters (distance between measurement points)

X (Origin): 8.6 meters initially generated random number
Y (Origin): 1.1 meters initially generated random number

Number of rows: 4
Number of columns: 6

Survey Point	Survey Location	
	X	Y
Starting Point (1)	8.6	1.1
2	6.2	1.1
3	3.8	1.1
4	1.4	1.1
5	11.0	1.1
6	13.4	1.1
7	8.6	3.5
8	6.2	3.5
9	3.8	3.5
10	1.4	3.5
11	11.0	3.5
12	13.4	3.5
13	8.6	5.9
14	6.2	5.9
15	3.8	5.9
16	1.4	5.9
17	11.0	5.9
18	13.4	5.9
NA	8.6	8.3
NA	6.2	8.3
NA	3.8	8.3
19	1.4	8.3
20	11.0	8.3
21	13.4	8.3

Row

1

2

3

4

SU011 Mezzanine Stairwell

COMPASS Report

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BUILDING SURFACE SURVEY PLAN

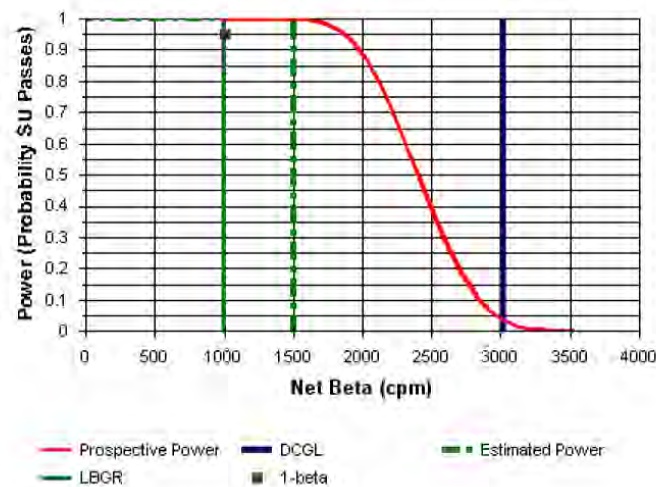
Survey Plan Summary

Site Name: EaglePicher
Planner(s): P Ely
Survey Unit Name: SU011 Mezzanine Stairwell
Comments: Reclassified

Statistical Design Details

Area (m ²):	50	Classification:	1
Selected Test:	Sign	Estimated Sigma (cpm/100 cm ²):	1,000
DCGL (cpm/100 cm ²):	3,024	Sample Size (N):	15
LBGR (cpm/100 cm ²):	1,000	Estimated Conc. (cpm/100 cm ²):	1,500
Alpha:	0.050	Estimated Power:	1.00
Beta:	0.050	Post-EMC Sample Size (N):	15

Prospective Power Curve



COMPASS Report

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Gross Beta Efficiency Data

Instrument Description: Ludlum 43-68 with 1 Layer Mylar (0.4 mg)
Physical Detector Area (cm²): 126
DCGLw (dpm/100 cm²): 60,000
Total Efficiency: 0.04
DCGLw (cpm/100 cm²): 3,024

Contaminant	HTDC ^a	Energy ^b	Fract ^c	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	No	49.47	1.0	0.14	0.25	0.04

^aHard-to-detect contaminant ^bAverage beta energy (keV) [N/A indicates alpha emission] ^cActivity fraction

Gross Beta Mean and Sigma Data

Count Time (min): 1
Sign Test Sigma (cpm/100 cm²): 1,000

Data/Material	Mean (cpm/100 cm ²)	Std. Dev. (cpm/100 cm ²)	MDC (dpm/100 cm ²)
SU	1,500	1,000	3,633

Elevated Measurement Comparison (EMC) for Gross Beta

Scanning Instrumentation Description: Ludlum 43-68 with 1 Layer Mylar (0.4 mg)
Background (cpm/100 cm²): 325
Total Scanning Efficiency: 0.04
True Positive Proportion: 0.85
False Positive Proportion: 0.6
Index of Sensitivity (d'): 0.82
Observation Interval (sec): 1.0
Surveyor Efficiency: 0.50
Area Factor Table Interpolation Method: Linear

Statistical Design

N: 15
Bounded Area (m²): 3.3
Area Factor:
DCGLw*:
Scan MDC Required*:

Hot Spot Design

Actual Scan MDC*: 4,048
Area Factor: N/A
Bounded Area (m²): N/A
Post-EMC N: 15

Contaminant	Energy ^a	Fract ^b	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	49.47	1.0	0.14	0.25	0.04

^aAverage beta energy (keV) [N/A indicates alpha emission] ^bActivity fraction

Report Created 10/28/2009 1437 (COMPASS v1.1.0)

Survey Package 011
Stairwell to Mezzanine
Floor Class 1 Area

X (Max): 3.52 meters
Y (Max): 8.51 meters
A (Area): 30 m²
Actual Survey Area: 30.0 m²
Required Survey Points: 15 0% percent void area
N (Points): 20 15 Estimated Minimum Points

$$L = \left[\frac{A}{N} \right]^{1/2}$$

for square grid

L= 1.2 meters (distance between measurement points)

X (Origin): 1.5 meters initially generated random number
Y (Origin): 6.9 meters initially generated random number

Number of rows: 7
Number of columns: 3

Survey Point	Survey Location	
	X	Y
Starting Point (1)	1.5	6.9
2	0.3	6.9
3	-0.9	6.9
4	-2.1	6.9
5	2.7	6.9
6	3.9	6.9
7	1.5	8.1
8	0.3	8.1
9	-0.9	8.1
10	-2.1	8.1
11	2.7	8.1
12	3.9	8.1
13	1.5	9.3
14	0.3	9.3
15	-0.9	9.3
16	-2.1	9.3
17	2.7	9.3
18	3.9	9.3
NA	1.5	10.5
NA	0.3	10.5
NA	-0.9	10.5
19	-2.1	10.5
20	2.7	10.5
21	3.9	10.5

Row

6

2

3

4

SU012 West Hallway

COMPASS Report

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BUILDING SURFACE SURVEY PLAN

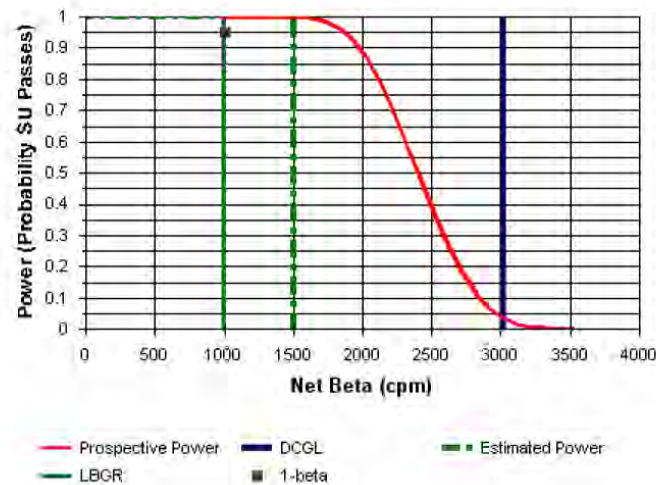
Survey Plan Summary

Site Name: EaglePicher
Planner(s): P Ely
Survey Unit Name: SU012 West Hallway
Comments: Reclassified

Statistical Design Details

Area (m ²):	50	Classification:	1
Selected Test:	Sign	Estimated Sigma (cpm/100 cm ²):	1,000
DCGL (cpm/100 cm ²):	3,024	Sample Size (N):	15
LBGR (cpm/100 cm ²):	1,000	Estimated Conc. (cpm/100 cm ²):	1,500
Alpha:	0.050	Estimated Power:	1.00
Beta:	0.050	Post-EMC Sample Size (N):	15

Prospective Power Curve



COMPASS Report

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Gross Beta Efficiency Data

Instrument Description: Ludlum 43-68 with 1 Layer Mylar (0.4 mg)
Physical Detector Area (cm²): 126
DCGLw (dpm/100 cm²): 60,000
Total Efficiency: 0.04
DCGLw (cpm/100 cm²): 3,024

Contaminant	HTDC ^a	Energy ^b	Fract ^c	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	No	49.47	1.0	0.14	0.25	0.04

^aHard-to-detect contaminant ^bAverage beta energy (keV) [N/A indicates alpha emission] ^cActivity fraction

Gross Beta Mean and Sigma Data

Count Time (min): 1
Sign Test Sigma (cpm/100 cm²): 1,000

Data/Material	Mean (cpm/100 cm ²)	Std. Dev. (cpm/100 cm ²)	MDC (dpm/100 cm ²)
SU	1,500	1,000	3,633

Elevated Measurement Comparison (EMC) for Gross Beta

Scanning Instrumentation Description: Ludlum 43-68 with 1 Layer Mylar (0.4 mg)
Background (cpm/100 cm²): 325
Total Scanning Efficiency: 0.04
True Positive Proportion: 0.85
False Positive Proportion: 0.6
Index of Sensitivity (d'): 0.82
Observation Interval (sec): 1.0
Surveyor Efficiency: 0.50
Area Factor Table Interpolation Method: Linear

Statistical Design

N: 15
Bounded Area (m²): 3.3
Area Factor:
DCGLw*:
Scan MDC Required*:

Hot Spot Design

Actual Scan MDC*: 4,048
Area Factor: N/A
Bounded Area (m²): N/A
Post-EMC N: 15

Contaminant	Energy ^a	Fract ^b	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	49.47	1.0	0.14	0.25	0.04

^aAverage beta energy (keV) [N/A indicates alpha emission] ^bActivity fraction

Report Created 10/28/2009 1511 (COMPASS v1.1.0)

Survey Package 012
West Hallway
Floor Class 1 Area

X (Max): 1.88 meters
Y (Max): 27.00 meters
A (Area): 51 m²
Actual Survey Area: 50.8 m²
Required Survey Points: 15 0% percent void area
N (Points): 27 15 Estimated Minimum Points

$$L = \left[\frac{A}{N} \right]^{1/2}$$

for square grid

L= 1.4 meters (distance between measurement points)

X (Origin): 0.4 meters initially generated random number
Y (Origin): 10.9 meters initially generated random number

Number of rows: 19
Number of columns: 1

Survey Point	Survey Location	
	X	Y
Starting Point (1)	0.4	10.9
2	0.4	12.3
3	0.4	13.7
4	0.4	15.1
5	0.4	16.5
6	0.4	17.9
7	0.4	19.3
8	0.4	20.7
9	0.4	22.1
10	0.4	23.5
11	0.4	24.9
12	0.4	26.3
13	0.4	9.5
14	0.4	8.1
15	0.4	6.7
16	0.4	5.3
17	0.4	3.9
18	0.4	2.5
19	0.4	1.1

SU013 Mezzanine Walls

COMPASS Report

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BUILDING SURFACE SURVEY PLAN

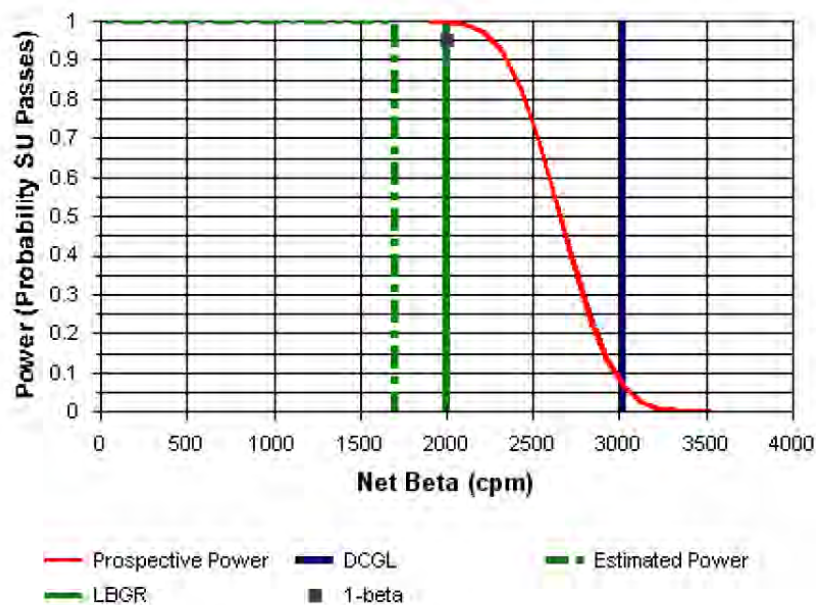
Survey Plan Summary

Site Name: EaglePicher
Planner(s): P Ely
Survey Unit Name: SU013 Mezzanine Walls
Comments: N/A

Statistical Design Details

Area (m ²):	270	Classification:	2
Selected Test:	Sign	Estimated Sigma (cpm/100 cm ²):	1,005
DCGL (cpm/100 cm ²):	3,024	Sample Size (N):	28
LBGR (cpm/100 cm ²):	2,000	Estimated Conc. (cpm/100 cm ²):	1,700
Alpha:	0.050	Estimated Power:	1.0
Beta:	0.050		

Prospective Power Curve



COMPASS Report

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Gross Beta Efficiency Data

Instrument Description: Ludlum 43-68 with 1 Layer Mylar (0.4 mg)
Physical Detector Area (cm²): 126
DCGLw (dpm/100 cm²): 60,000
Total Efficiency: 0.04
DCGLw (cpm/100 cm²): 3,024

Contaminant	HTDC ^a	Energy ^b	Fract ^c	Inst. Eff.	Surf. Eff.	Total Eff.
C-14	No	49.47	1.0	0.14	0.25	0.04

^aHard-to-detect contaminant ^bAverage beta energy (keV) [N/A indicates alpha emission] ^cActivity fraction

Gross Beta Mean and Sigma Data

Count Time (min): 1
Sign Test Sigma (cpm/100 cm²): 1,005

Data/Material	Mean (cpm/100 cm ²)	Std. Dev. (cpm/100 cm ²)	MDC (dpm/100 cm ²)
SU	2,500	1,000	4,673
Concrete Block	800	100	2,669

Report Created 10/29/2009 2203 (COMPASS v1.1.0)

Survey Package 013
Mezzanine
Walls Class 2 Area

X (Max): 88.90 meters
Y (Max): 3.00 meters
A (Area): 267 m²
Actual Survey Area: 266.7 m²
Required Survey Points: 28 0% percent void area
N (Points): 30 28 Estimated Minimum Points

$$L = \left[\frac{A}{N} \right]^{1/2}$$

for square grid

L= 3.0 meters (distance between measurement points)

X (Origin): 60.2 meters initially generated random number
Y (Origin): 2.7 meters initially generated random number

Number of rows: 1 3
Number of columns: 30 10

Survey Point	Survey Location	
	X	Y
Starting Point (1)	0.2	2.7
2	3.2	0.7
3	6.2	1.7
4	9.2	2.7
5	12.2	0.7
6	15.2	1.7
7	18.2	2.7
8	21.2	0.7
9	24.2	1.7
10	27.2	2.7
11	30.2	0.7
12	33.2	1.7
13	36.2	2.7
14	39.2	0.7
15	42.2	1.7
16	45.2	2.7
17	48.2	0.7
18	51.2	1.7
19	54.2	2.7
20	57.2	0.7
21	60.2	1.7
22	63.2	2.7
23	66.2	0.7
24	69.2	1.7
25	72.2	2.7
26	75.2	0.7
27	78.2	1.7
28	81.2	2.7
29	84.2	0.7
30	87.2	1.7

Note random start location with offset survey locations have been sorted to place survey locations in an ordered sequence.

Attachment 7.5: Landfill Activity Estimate

An estimate of the activity sent to the landfill from the EaglePicher decommissioning in Lenexa Kansas was generated based on average activities on building surfaces and building surface areas of materials sent to the landfill. The activities were average activities measured during the Final Status Survey as indicated in Table 4-1 of this report. In order to accurately estimate activities, removable activity measurements were utilized including the factor of 10 increase based on a 10% smear activity removal efficiency. The direct C-14 measurements were not used because they would have resulted in an overestimation of the C-14 activity as material specific backgrounds were not subtracted from each measurement. In addition there was no equivalent H-3 measurement data as H-3 can not be directly measured with portable survey instrumentation.

The table below provides a listing of sizes for the various walls and floors, the associated activity levels, the waste weight, and the total and average activities for H-3 and C-14 in the waste sent to the landfill.

Landfill Activity Estimate

Building Area	Area (ft ²)	C-14 Activity* (dpm/100 cm ²)	C-14 Activity (pCi)	H-3 Activity* (dpm/100 cm ²)	H-3 Activity (pCi)	CD Landfill	
						Volume (ft ³)	Weight (lbs)
East Outside Wall	2,295	1.78E+01	1.71E+05	6.77E+01	6.50E+05	2,295	275,400
East Office Area East Wall	800	5.62E+01	1.88E+05	3.07E+01	1.03E+05	400	6,000
East Office Area West Wall	800	5.62E+01	1.88E+05	3.07E+01	1.03E+05	400	6,000
East Office Area Account. Wall	250	5.62E+01	5.88E+04	3.07E+01	3.21E+04	125	1,875
East Office Area East Library Wall	1,250	5.62E+01	2.94E+05	3.07E+01	1.60E+05	625	9,375
East Office Area West Library Wall	1,250	5.62E+01	2.94E+05	3.07E+01	1.60E+05	625	9,375
East Office Area Stockroom West Wall	420	5.62E+01	9.87E+04	3.07E+01	5.39E+04	210	3,150
East Office Area Office Wall	90	5.62E+01	2.12E+04	3.07E+01	1.15E+04	45	675
East Office Area Restroom West Wall	420	5.62E+01	9.87E+04	3.07E+01	5.39E+04	210	3,150
East Office Area Solvent Storage Hallway East Wall	350	5.62E+01	8.23E+04	3.07E+01	4.49E+04	175	2,625
East Office Area Solvent Storage Hallway West Wall	420	5.62E+01	9.87E+04	3.07E+01	5.39E+04	210	3,150
East Office Area NMR Lab East Wall	200	5.62E+01	4.70E+04	3.07E+01	2.57E+04	100	1,500
West Outside Wall	3,380	1.78E+01	2.52E+05	6.77E+01	9.57E+05	3,380	405,600
North Outside Wall	2,210	1.78E+01	1.65E+05	6.77E+01	6.26E+05	2,210	265,200
North Outside Wall	1,292	1.78E+01	9.62E+04	6.77E+01	3.66E+05	1,292	155,040
East Office Area South Office Wall	200	5.62E+01	4.70E+04	3.07E+01	2.57E+04	100	1,500
East Office Area South Office Wall	200	5.62E+01	4.70E+04	3.07E+01	2.57E+04	100	1,500
East Office Area South Hallway North Wall	520	5.62E+01	1.22E+05	3.07E+01	6.67E+04	260	3,900
East Office Area Accounting North Wall	200	5.62E+01	4.70E+04	3.07E+01	2.57E+04	100	1,500
East Office Area Center Hallway South Wall	520	5.62E+01	1.22E+05	3.07E+01	6.67E+04	260	3,900
East Office Area Center Hallway North Wall	940	5.62E+01	2.21E+05	3.07E+01	1.21E+05	470	7,050
East Office Area Main Entrance North Wall	940	5.62E+01	2.21E+05	3.07E+01	1.21E+05	470	7,050
East Office Area Lunch Room South Wall	920	5.62E+01	2.16E+05	3.07E+01	1.18E+05	460	6,900
East Office Area Lunch Room North Wall	920	5.62E+01	2.16E+05	3.07E+01	1.18E+05	460	6,900
South Outside Wall	3,485	1.78E+01	2.59E+05	6.77E+01	9.87E+05	3,485	418,200
Mechanical Room North Wall	460	5.62E+01	1.08E+05	3.07E+01	5.90E+04	460	55,200
Slab	15,720	4.65E+02	3.06E+07	5.14E+02	3.38E+07	7,860	943,200
Remaining Slab	2,700	4.65E+02	5.25E+06	5.14E+02	5.81E+06	1,350	162,000
Column Pads	136	5.62E+01	3.20E+04	3.07E+01	1.74E+04	204	24,480
Roof	15,720	4.31E+01	2.84E+06	9.17E+01	6.04E+06	7,860	943,200
Roof	9,825	2.72E+01	1.12E+06	3.05E+01	1.25E+06	4,913	589,500
Footers	2,204	5.62E+01	5.18E+05	3.07E+01	2.83E+05	3,306	396,720
Machine Rm HVAC	544	5.62E+01	1.28E+05	3.07E+01	6.98E+04	960	38,400
Compressor	33	5.62E+01	7.75E+03	3.07E+01	4.23E+03	18	1,080
Boiler	42	5.62E+01	9.97E+03	3.07E+01	5.44E+03	45	5,400
Total (pCi):			4.43E+07		5.25E+07	45,443	4,765,695
Average Concentration in Landfill Waste (pCi/g):			2.05E-02		2.43E-02		

* These activities were based on removable activity measurements assuming a smear removal efficiency of 10%.

Attachment 7.6: Laboratory Analytical Reports

Analytical Report	Attachment Pages	Samples
Test America 220-10654-1	1 to 64	ES-SU009-S-01 ES-SU009-S-02 ES-SU009-S-03 ES-SU009-S-04 ES-SU009-S-05 ES-SU009-S-11 ES-SU009-S-12 ES-SU009-S-17 ES-SU009-S-19 ES-SU009-S-20 ES-SU009-S-26 ES-SU009-S-30 ES-SU009-S-32 ES-SU009-S-36 ES-SU009-S-36A
Test America 220-10920	65 to 92	ES-SU009-S-6 ES-SU009-S-7 ES-SU009-S-8 ES-SU009-S-9 ES-SU009-S-10 ES-SU009-S-13 ES-SU009-S-16 ES-SU009-S-23 ES-SU009-S-24 ES-SU009-S-25 ES-SU009-S-27 ES-SU009-S-28 ES-SU009-S-29 ES-SU009-S-31 ES-SU009-S-34 ES-SU009-S-35 ES-B-S-10
Eberline WO#09-11114-OR	93 to 176	ES-SU009-S-15 ES-SU009-S-18 ES-SU009-S-21 ES-B-S-1 ES-B-S-2 ES-B-S-3 ES-B-S-4 ES-B-S-5 ES-B-S-6 ES-B-S-7 ES-B-S-8 ES-B-S-9

ANALYTICAL REPORT

Job Number: 220-10654-1

SDG Number: 220-10654

Job Description: Lenexa, KS

For:

Energy Solutions, LLC
1009 Commerce Park Drive
Suite 100
Oak Ridge, TN 37830

Attention: Mr. John Davis



Approved for release.
Erin A. Arasate
Project Manager I
12/8/2009 10:26 AM

Erin A. Arasate
Project Manager I
erin.arasate@testamericainc.com
12/08/2009
Revision: 1

The test results in this report meet all NELAP requirements unless specified within the case narrative. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Project Manager.

TestAmerica Connecticut Certifications and Approvals: CTDOH PH-047, MADEP CT023, RIDOH A43, NYDOH 10602, NY NELAP 10602, NHDES 2528, NJDEP CT410, ME DOH CT023, UT DOH 2032614458

TestAmerica Laboratories, Inc.

TestAmerica Connecticut 128 Long Hill Cross Road, Shelton, CT 06484

Tel (203) 929-8140 Fax (203) 929-8142 www.testamericainc.com



Job Narrative
220-10654-1

Comments

No additional comments.

Receipt

No analytical or quality issues were noted.

METHOD SUMMARY

Client: Energy Solutions, LLC

Job Number: 220-10654-1

Sdg Number: 220-10654

Description		Lab Location	Method	Preparation Method
Matrix	Solid			
Tritium		TAL SL	RAD EPA EPA	

Lab References:

TAL SL = TestAmerica St. Louis

Method References:

RAD EPA = EPA Radioanalytical Methodology

SAMPLE SUMMARY

Client: Energy Solutions, LLC

Job Number: 220-10654-1

Sdg Number: 220-10654

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
220-10654-1	ES-SU009-S-01	Solid	11/06/2009 0900	11/09/2009 0856
220-10654-2	ES-SU009-S-02	Solid	11/06/2009 0910	11/09/2009 0856
220-10654-3	ES-SU009-S-03	Solid	11/06/2009 0920	11/09/2009 0856
220-10654-4	ES-SU009-S-04	Solid	11/06/2009 0930	11/09/2009 0856
220-10654-5	ES-SU009-S-05	Solid	11/06/2009 0940	11/09/2009 0856
220-10654-6	ES-SU009-S-11	Solid	11/06/2009 0955	11/09/2009 0856
220-10654-7	ES-SU009-S-12	Solid	11/06/2009 1005	11/09/2009 0856
220-10654-8	ES-SU009-S-17	Solid	11/06/2009 1015	11/09/2009 0856
220-10654-9	ES-SU009-S-19	Solid	11/06/2009 1025	11/09/2009 0856
220-10654-10	ES-SU009-S-20	Solid	11/06/2009 1035	11/09/2009 0856
220-10654-11	ES-SU009-S-26	Solid	11/06/2009 1045	11/09/2009 0856
220-10654-12	ES-SU009-S-30	Solid	11/06/2009 1055	11/09/2009 0856
220-10654-13	ES-SU009-S-32	Solid	11/06/2009 1125	11/09/2009 0856
220-10654-14	ES-SU009-S-36	Solid	11/06/2009 1110	11/09/2009 0856
220-10654-15	ES-SU009-S-36 A	Solid	11/06/2009 1110	11/09/2009 0856

SAMPLE RESULTS

QUALITY CONTROL RESULTS

SUBCONTRACTED DATA



TestAmerica Laboratories, Inc.

ANALYTICAL REPORT

PROJECT NO. 220-10654

Lenexa, KS

Lot #: F9K110458

TestAmerica Connecticut

TestAmerica Connecticut
128 Long Hill Cross Road
Shelton, CT 06484

TESTAMERICA LABORATORIES, INC.

A handwritten signature in black ink, appearing to read "Kay Clay".

Kay Clay

Project Manager

November 25, 2009

Case Narrative
LOT NUMBER: F9K110458

This report contains the analytical results for the 15 samples received under chain of custody by TestAmerica St. Louis on November 11, 2009. These samples are associated with your Lenexa, KS project.

The analytical results included in this report meet all applicable quality control procedure requirements.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by TestAmerica St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. **TestAmerica St. Louis' Florida certification number is E87689.** The case narrative is an integral part of this report.

This report shall not be reproduced, except in full, without the written approval of the laboratory.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

There are no observations or nonconformances associated with the analysis in this lot.

METHODS SUMMARY**F9K110458**

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Percent Moisture	MCAWW 160.3 MOD	MCAWW 160.3 MOD
Tritium by LSC	EML H3-04-RC MO	

References:

EML "ENVIRONMENTAL MEASUREMENTS LABORATORY PROCEDURES MANUAL"
HASL-300 28TH EDITION, VOLUME I and II DEPARTMENT OF ENERGY

MCAWW "Methods for Chemical Analysis of Water and Wastes",
EPA-600/4-79-020, March 1983 and subsequent revisions.

SAMPLE SUMMARY**F9K110458**

<u>WO #</u>	<u>SAMPLE#</u>	<u>CLIENT SAMPLE ID</u>	<u>SAMPLED DATE</u>	<u>SAMP TIME</u>
LN8LX	001	ES-SU009-S-01	11/06/09	09:00
LN8L4	002	ES-SU009-S-02	11/06/09	09:10
LN8L5	003	ES-SU009-S-03	11/06/09	09:20
LN8L6	004	ES-SU009-S-04	11/06/09	09:30
LN8L7	005	ES-SU009-S-05	11/06/09	09:40
LN8L8	006	ES-SU009-S-11	11/06/09	09:55
LN8L9	007	ES-SU009-S-12	11/06/09	10:05
LN8MA	008	ES-SU009-S-17	11/06/09	10:15
LN8MD	009	ES-SU009-S-19	11/06/09	10:25
LN8ME	010	ES-SU009-S-20	11/06/09	10:35
LN8MF	011	ES-SU009-S-26	11/06/09	10:45
LN8MH	012	ES-SU009-S-30	11/06/09	10:55
LN8MJ	013	ES-SU009-S-32	11/06/09	11:25
LN8MM	014	ES-SU009-S-36	11/06/09	11:10
LN8MN	015	ES-SU009-S-36 A	11/06/09	11:10

NOTE(S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-01

Radiochemistry

Lab Sample ID: F9K110458-001
Work Order: LN8LX
Matrix: SOLID

Date Collected: 11/06/09 0900
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	0.23	U	0.17	2.00	0.24	11/12/09	11/13/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-02

Radiochemistry

Lab Sample ID: F9K110458-002
Work Order: LN8L4
Matrix: SOLID

Date Collected: 11/06/09 0910
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	-0.03	U	0.12	2.00	0.24	11/12/09	11/13/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-03

Radiochemistry

Lab Sample ID: F9K110458-003
Work Order: LN8L5
Matrix: SOLID

Date Collected: 11/06/09 0920
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	0.03	U	0.14	2.00	0.26	11/12/09	11/13/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-04

Radiochemistry

Lab Sample ID: F9K110458-004
Work Order: LN8L6
Matrix: SOLID

Date Collected: 11/06/09 0930
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	0.11	U	0.15	2.00	0.24	11/12/09	11/13/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-05

Radiochemistry

Lab Sample ID: F9K110458-005

Date Collected: 11/06/09 0940

Work Order: LN8L7

Date Received: 11/11/09 0910

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	0.15	U	0.15	2.00	0.25	11/12/09	11/13/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-11

Radiochemistry

Lab Sample ID: F9K110458-006
Work Order: LN8L8
Matrix: SOLID

Date Collected: 11/06/09 0955
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	-0.09	U	0.11	2.00	0.24	11/12/09	11/13/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-12

Radiochemistry

Lab Sample ID: F9K110458-007
Work Order: LN8L9
Matrix: SOLID

Date Collected: 11/06/09 1005
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	-0.11	U	0.11	2.00	0.25	11/12/09	11/13/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-17

Radiochemistry

Lab Sample ID: F9K110458-008
Work Order: LN8MA
Matrix: SOLID

Date Collected: 11/06/09 1015
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	0.02	U	0.14	2.00	0.25	11/12/09	11/14/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-19

Radiochemistry

Lab Sample ID: F9K110458-009
Work Order: LN8MD
Matrix: SOLID

Date Collected: 11/06/09 1025
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	-0.05	U	0.12	2.00	0.25	11/12/09	11/14/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-20

Radiochemistry

Lab Sample ID: F9K110458-010
Work Order: LN8ME
Matrix: SOLID

Date Collected: 11/06/09 1035
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	0.17	U	0.16	2.00	0.25	11/12/09	11/14/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-26

Radiochemistry

Lab Sample ID: F9K110458-011
Work Order: LN8MF
Matrix: SOLID

Date Collected: 11/06/09 1045
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	0.03	U	0.13	2.00	0.24	11/12/09	11/14/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-30

Radiochemistry

Lab Sample ID: F9K110458-012
Work Order: LN8MH
Matrix: SOLID

Date Collected: 11/06/09 1055
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	0.12	U	0.15	2.00	0.25	11/12/09	11/14/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-32

Radiochemistry

Lab Sample ID: F9K110458-013
Work Order: LN8MJ
Matrix: SOLID

Date Collected: 11/06/09 1125
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	-0.10	U	0.11	2.00	0.25	11/12/09	11/14/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-36

Radiochemistry

Lab Sample ID: F9K110458-014
Work Order: LN8MM
Matrix: SOLID

Date Collected: 11/06/09 1110
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	0.007	U	0.13	2.00	0.24	11/12/09	11/14/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-36 A

Radiochemistry

Lab Sample ID: F9K110458-015
Work Order: LN8MN
Matrix: SOLID

Date Collected: 11/06/09 1110
Date Received: 11/11/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9316165	Yld %
Tritium	-0.03	U	0.12	2.00	0.25	11/12/09	11/14/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

METHOD BLANK REPORT

Radiochemistry

Client Lot ID: F9K110458
Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	MDC	Prep Date	Lab Sample ID Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.			pCi/g	Batch #	9316165	Yld %	F9K120000-165B
Tritium	-0.04	U	0.11	2.00	0.22	11/12/09	11/13/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

Laboratory Control Sample Report

Radiochemistry

Client Lot ID: F9K110458
Matrix: SOLID

Parameter	Spike Amount	Result	Total Uncert.	MDC	Lab Sample ID		QC Control Limits
			(2 σ +/-)		% Yld	% Rec	
Tritium by LSC by DOE H3-04-RC MOD.			pCi/g	H3-04-RC MOD		F9K120000-165C	
Tritium	15.3	15.2	1.2	0.2		99	(75 - 104)
	Batch #:	9316165		Analysis Date:	11/13/09		

NOTE(S)

MDC is determined by instrument performance only

DUPLICATE EVALUATION REPORT

Radiochemistry

Client Lot ID: F9K110458
 Matrix: SOLID

Date Sampled: 11/06/09
 Date Received: 11/11/09

Parameter	SAMPLE Result	Total Uncert. (2 σ +/-)	% Yld	DUPLICATE Result	Total Uncert. (2 σ +/-)	% Yld	QC Sample ID Precision
Tritium by LSC by DOE H3-04-RC MOD.			pCi/g	H3-04-RC MOD			F9K110458-001
Tritium	0.23 U	0.17		-0.03 U	0.12		253 %RPD
	Batch #:	9316165 (Sample)		9316165 (Duplicate)			

NOTE(S)

Data are incomplete without the case narrative.

Calculations are performed before rounding to avoid round-off error in calculated results

U Result is less than the sample detection limit.

MATRIX SPIKE REPORT

Radiochemistry

Client Lot Id: F9K110458
 Matrix: SOLID

Date Sampled: 11/06/09
 Date Received: 11/11/09

Parameter	Spike Amount	Spike Result	Total Uncert. (2σ +/-)	Spike Yld.	Sample Result	Total Uncert. (2σ +/-)	QC Sample ID		QC Control Limits
							%YLD	%REC	
Tritium by LSC by DOE H3-04-RC MOD.			pCi/g	H3-04-RC MOD			F9K110458-002		
Tritium	15.3	15.0	1.2		-0.03	0.12	98		(62 - 129)
Batch #:		9316165	Analysis Date:		11/13/09				

NOTE(S)

Data are incomplete without the case narrative.

Calculations are performed before rounding to avoid round-off errors in calculated results.

stAmerica Connecticut
Long Hill Cross Road
Iton, CT 06484
ne (203) 929-8140 Fax (203) 929-8142

Chain of Custody Record

WR-38

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)

Company:
Contact:
Phone:
E-Mail:

Sampler:

Lab PM:

Carrier Tracking No(s):

COC No:

Address:
City:
State:
Zip:
Phone:
Fax:

Project #:

SSOW#:

Lab PM:

Carrier Tracking No(s):

COC No:

Analysis Requested

Due Date Requested:

TAT Requested (days):

PO #:

WO #:

Project #:

SSOW#:

Analysis Requested

Due Date Requested:

TAT Requested (days):

PO #:

WO #:

Project #:

SSOW#:

Sample ID	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=other)	Preservation Code	Field Filtered Sample (Yes/No)	Subcontract/DOE H3, H4, RC - Tritium	Analysis Requested	Due Date Requested	TAT Requested (days)	PO #	WO #	Project #	SSOW#
ES-SU009-S-01	11/6/09	9:00	Solid	Solid			X		11/25/2009				22002640	
ES-SU009-S-02	11/6/09	9:10	Solid	Solid			X							
ES-SU009-S-03	11/6/09	9:20	Solid	Solid			X							
ES-SU009-S-04	11/6/09	9:30	Solid	Solid			X							
ES-SU009-S-05	11/6/09	9:40	Solid	Solid			X							
ES-SU009-S-11	11/6/09	9:55	Solid	Solid			X							
ES-SU009-S-12	11/6/09	10:05	Solid	Solid			X							
ES-SU009-S-17	11/6/09	10:15	Solid	Solid			X							
ES-SU009-S-19	11/6/09	10:25	Solid	Solid			X							
ES-SU009-S-20	11/6/09	10:35	Solid	Solid			X							
ES-SU009-S-26	11/6/09	10:45	Solid	Solid			X							

Sample ID	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=other)	Preservation Code	Field Filtered Sample (Yes/No)	Subcontract/DOE H3, H4, RC - Tritium	Analysis Requested	Due Date Requested	TAT Requested (days)	PO #	WO #	Project #	SSOW#
ES-SU009-S-01	11/6/09	9:00	Solid	Solid			X		11/25/2009				22002640	
ES-SU009-S-02	11/6/09	9:10	Solid	Solid			X							
ES-SU009-S-03	11/6/09	9:20	Solid	Solid			X							
ES-SU009-S-04	11/6/09	9:30	Solid	Solid			X							
ES-SU009-S-05	11/6/09	9:40	Solid	Solid			X							
ES-SU009-S-11	11/6/09	9:55	Solid	Solid			X							
ES-SU009-S-12	11/6/09	10:05	Solid	Solid			X							
ES-SU009-S-17	11/6/09	10:15	Solid	Solid			X							
ES-SU009-S-19	11/6/09	10:25	Solid	Solid			X							
ES-SU009-S-20	11/6/09	10:35	Solid	Solid			X							
ES-SU009-S-26	11/6/09	10:45	Solid	Solid			X							

Special Instructions/Note:
250 G
each

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements:

Method of Shipment:

Date: 11/16/09 1700

Received by: [Signature] Company: [Blank]

Date/Time: 11/16/09 0910

Received by: [Signature] Company: [Blank]

Date/Time: [Blank]

Received by: [Blank] Company: [Blank]

Date/Time: [Blank]

Cooler Temperature(s) °C and Other Remarks:

Custody Seal No.: [Blank]

Δ Yes Δ No

ent Information (Sub Contract Lab)

it Contact:

ping/Receiving

pany:

tAmerica Laboratories, Inc.

ess:

15 Rider Trail North,

th City

a, Zip:

63045

ne:

1-298-8566(Tel) 314-298-8757(Fax)

ilit:

ect Name:

lexa, KS

SSOW#:

Project #:

22002640

SSOW#:

PO #:

WO #:

Project #:

22002640

SSOW#:

Sample Date

Sample Time

Sample Type

Matrix

Sample Date

Sample Time

Sample Type

Matrix

Sample Date

Sample Time

Sample Type

Matrix

Sample Date

Sample Time

Sample Type

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Sample Type

Matrix

Sample Date

Sample Time

Sample Type

Matrix

Sample Date

Sample Time

Sample Type

Matrix

Sample Date

Sample Time

Sample Type

Chain of Custody Record

Sampler:

Lab PM:

Arasate, Erin A

E-Mail:

erin.arasate@testamericainc.com

Phone:

Carrier Tracking No(s):

220-4471.2

Page:

Page 2 of 2

Job #:

220-10654-1

Analysis Requested

Preservation Codes:

A - HCL

M - Hexane

B - NaOH

N - None

C - Zn Acetate

O - AsNaO2

D - Nitric Acid

P - Na2O4S

E - NaHSO4

Q - Na2SO3

F - MeOH

R - Na2S2O3

G - Arndor

T - TSP Dodecahydrate

H - Ascorbic Acid

I - Ice

J - DI Water

K - EDTA

L - EDA

Other:

Special Instructions/Note:

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return To Client

Disposal By Lab

Archive For

Months

Special Instructions/QC Requirements:

Method of Shipment:

Received by:

Received by:

Received by:

Company

Company

Company

Company

Company

Company

Company

Company

Company

Company

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CR-58

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Lot #(s): F9K110458

CONDITION UPON RECEIPT FORM

Client: TA ConnQuote No: 84478COC/RFA No: 220-4471.1/220-4471.2

38

Initiated By: CR Date: 11/11/09 Time: 0910

Shipping Information

Shipper: FedEx UPS DHL Courier Client Other: _____ Multiple Packages: Y (N)

Shipping # (s):*

Sample Temperature (s):**

1. <u>4220 7055 0388</u>	6. _____	1. <u>ambient</u>	6. _____
2. _____	7. _____	2. _____	7. _____
3. _____	8. _____	3. _____	8. _____
4. _____	9. _____	4. _____	9. _____
5. _____	10. _____	5. _____	10. _____

*Numbered shipping lines correspond to Numbered Sample Temp lines

**Sample must be received at 4°C ± 2°C- If not, note contents below. Temperature variance does NOT affect the following: Metals-Liquid or Rad tests- Liquid or Solids

Condition (Circle "Y" for yes, "N" for no and "N/A" for not applicable):

1. <u>(Y)</u> N	Are there custody seals present on the cooler?	8. Y <u>(N)</u>	Are there custody seals present on bottles?
2. Y <u>(N)</u> N/A	Do custody seals on cooler appear to be tampered with?	9. Y N <u>(N/A)</u>	Do custody seals on bottles appear to be tampered with?
3. <u>(Y)</u> N	Were contents of cooler frisked after opening, but before unpacking?	10. Y N <u>(N/A)</u>	Was sample received with proper pH ¹ ? (If not, make note below)
4. <u>(Y)</u> N	Sample received with Chain of Custody?	11. <u>(Y)</u> N	Sample received in proper containers?
5. <u>(Y)</u> N N/A	Does the Chain of Custody match sample ID's on the container(s)?	12. Y N <u>(N/A)</u>	Headspace in VOA or TOX liquid samples? (If Yes, note sample ID's below)
*6. <u>(Y)</u> N	Was sample received broken?	13. Y N <u>(N/A)</u>	Was Internal COC/Workshare received?
7. <u>(Y)</u> N	Is sample volume sufficient for analysis?	14. Y N <u>(N/A)</u>	Was pH taken by original TestAmerica lab?

¹ For DOE-AL (Pantex, LANL, Sandia) sites, pH of ALL containers received must be verified, EXCEPT VOA, TOX and soils.

Notes:

* ES-SU009-S-03
received broken
put in 500 G

Corrective Action:

☐ Client Contact Name: _____

Informed by: _____

☐ Sample(s) processed "as is"☐ Sample(s) on hold until: _____

If released, notify: _____

Project Management Review: CSDate: 11-16-09

THIS FORM MUST BE COMPLETED AT THE TIME THE ITEMS ARE BEING CHECKED IN. IF ANY ITEM IS COMPLETED BY SOMEONE OTHER THAN THE INITIATOR, THEN THAT PERSON IS REQUIRED TO APPLY THEIR INITIAL AND THE DATE NEXT TO THAT ITEM.

ADMIN-0004, REVISED 10/21/08 \\Slsrv01\QA\FORMS\ST-LOUIS\ADMIN\Admin004 rev11.doc



TestAmerica Laboratories, Inc.

ANALYTICAL REPORT

Lenexa, KS

Lot #: F9K300455

TestAmerica Connecticut

TestAmerica Connecticut
128 Long Hill Cross Road
Shelton, CT 06484

TESTAMERICA LABORATORIES, INC.

A handwritten signature in cursive script that reads "Kay Clay".

Kay Clay
Project Manager

December 7, 2009

Case Narrative
LOT NUMBER: F9K300455

This report contains the analytical results for the 15 samples received under chain of custody by TestAmerica St. Louis on November 30, 2009. These samples are associated with your Lenexa, KS project.

The analytical results included in this report meet all applicable quality control procedure requirements.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by TestAmerica St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. **TestAmerica St. Louis' Florida certification number is E87689.** The case narrative is an integral part of this report.

This report shall not be reproduced, except in full, without the written approval of the laboratory.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

There are no observations or nonconformances associated with the analysis in this lot.

METHODS SUMMARY**F9K300455**

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Carbon 14 by LSC	EERF C-01-1	

References:

EERF EERF

SAMPLE SUMMARY**F9K300455**

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
LP9AG	001	ES-SU009-S-01	11/06/09	09:00
LP9AH	002	ES-SU009-S-02	11/06/09	09:10
LP9AJ	003	ES-SU009-S-03	11/06/09	09:20
LP9AK	004	ES-SU009-S-04	11/06/09	09:30
LP9AL	005	ES-SU009-S-05	11/06/09	09:40
LP9AM	006	ES-SU009-S-11	11/06/09	09:55
LP9AN	007	ES-SU009-S-12	11/06/09	10:05
LP9AP	008	ES-SU009-S-17	11/06/09	10:15
LP9AQ	009	ES-SU009-S-19	11/06/09	10:25
LP9AR	010	ES-SU009-S-20	11/06/09	10:35
LP9AT	011	ES-SU009-S-26	11/06/09	10:45
LP9AV	012	ES-SU009-S-30	11/06/09	10:55
LP9AX	013	ES-SU009-S-32	11/06/09	11:25
LP9A0	014	ES-SU009-S-36	11/06/09	11:10
LP9A1	015	ES-SU009-S-36 A	11/06/09	11:10

NOTE(S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-01

Radiochemistry

Lab Sample ID: F9K300455-001
Work Order: LP9AG
Matrix: SOLID

Date Collected: 11/06/09 0900
Date Received: 11/30/09 1600

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	0.77	U	0.65	5.00	1.0	12/02/09	12/03/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-02

Radiochemistry

Lab Sample ID: F9K300455-002
Work Order: LP9AH
Matrix: SOLID

Date Collected: 11/06/09 0910
Date Received: 11/30/09 1600

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	3.36	J	0.85	5.00	1.0	12/02/09	12/03/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica Connecticut
Client Sample ID: ES-SU009-S-03

Radiochemistry

Lab Sample ID: F9K300455-003
Work Order: LP9AJ
Matrix: SOLID

Date Collected: 11/06/09 0920
Date Received: 11/30/09 1600

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	1.70	J	0.72	5.00	1.0	12/02/09	12/03/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-04

Radiochemistry

Lab Sample ID: F9K300455-004
Work Order: LP9AK
Matrix: SOLID

Date Collected: 11/06/09 0930
Date Received: 11/30/09 1600

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	1.18	J	0.69	5.00	1.0	12/02/09	12/03/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-05

Radiochemistry

Lab Sample ID: F9K300455-005

Work Order: LP9AL

Matrix: SOLID

Date Collected: 11/06/09 0940

Date Received: 11/30/09 1600

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	2.20	J	0.75	5.00	1.0	12/02/09	12/03/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-11

Radiochemistry

Lab Sample ID: F9K300455-006

Date Collected: 11/06/09 0955

Work Order: LP9AM

Date Received: 11/30/09 1600

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	2.79	J	0.81	5.00	1.0	12/02/09	12/03/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-12

Radiochemistry

Lab Sample ID: F9K300455-007

Date Collected: 11/06/09 1005

Work Order: LP9AN

Date Received: 11/30/09 1600

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	1.52	J	0.71	5.00	1.0	12/02/09	12/03/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica Connecticut
Client Sample ID: ES-SU009-S-17

Radiochemistry

Lab Sample ID: F9K300455-008
Work Order: LP9AP
Matrix: SOLID

Date Collected: 11/06/09 1015
Date Received: 11/30/09 1600

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	4.87	J	0.97	5.00	1.0	12/02/09	12/03/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-19

Radiochemistry

Lab Sample ID: F9K300455-009
Work Order: LP9AO
Matrix: SOLID

Date Collected: 11/06/09 1025
Date Received: 11/30/09 1600

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	2.61	J	0.79	5.00	1.0	12/02/09	12/03/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-20

Radiochemistry

Lab Sample ID: F9K300455-010
Work Order: LP9AR
Matrix: SOLID

Date Collected: 11/06/09 1035
Date Received: 11/30/09 1600

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	13.6		1.6	5.0	1.0	12/02/09	12/03/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-26

Radiochemistry

Lab Sample ID: F9K300455-011
Work Order: LP9AT
Matrix: SOLID

Date Collected: 11/06/09 1045
Date Received: 11/30/09 1600

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	1.84	J	0.73	5.00	1.0	12/02/09	12/03/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-30

Radiochemistry

Lab Sample ID: F9K300455-012
Work Order: LP9AV
Matrix: SOLID

Date Collected: 11/06/09 1055
Date Received: 11/30/09 1600

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	4.47	J	0.94	5.00	1.0	12/02/09	12/04/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-32

Radiochemistry

Lab Sample ID: F9K300455-013
Work Order: LP9AX
Matrix: SOLID

Date Collected: 11/06/09 1125
Date Received: 11/30/09 1600

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	1.55	J	0.71	5.00	1.0	12/02/09	12/04/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-36

Radiochemistry

Lab Sample ID: F9K300455-014
Work Order: LP9A0
Matrix: SOLID

Date Collected: 11/06/09 1110
Date Received: 11/30/09 1600

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	0.62	U	0.64	5.00	1.0	12/02/09	12/04/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-36 A

Radiochemistry

Lab Sample ID: F9K300455-015
Work Order: LP9A1
Matrix: SOLID

Date Collected: 11/06/09 1110
Date Received: 11/30/09 1600

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9336123	Yld %
Carbon 14	0.97	U	0.66	5.00	1.0	12/02/09	12/04/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

METHOD BLANK REPORT

Radiochemistry

Client Lot ID: F9K300455
Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	MDC	Prep Date	Lab Sample ID Analysis Date
Carbon 14 by EERF C-01-1			pCi/g	Batch #	9336123	Yld %	F9L020000-123B
Carbon 14	0.28	U	0.61	5.00	1.0	12/02/09	12/03/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

Laboratory Control Sample Report

Radiochemistry

Client Lot ID: F9K300455
Matrix: SOLID

Parameter	Spike Amount	Result	Total Uncert. (2 σ +/-)	MDC	% Yld	% Rec	Lab Sample ID QC Control Limits
Carbon 14 by EERF C-01-1			pCi/g	C-01-1			F9L020000-123C
Carbon 14	73.2	56.4	4.8	1.0		77	(62 - 109)
	Batch #:	9336123		Analysis Date:	12/03/09		

NOTE(S)

MDC is determined by instrument performance only

DUPLICATE EVALUATION REPORT

Radiochemistry

Client Lot ID: F9K300455
 Matrix: SOLID

Date Sampled: 11/06/09
 Date Received: 11/30/09

Parameter	SAMPLE Result	Total Uncert. (2 σ +/-)	% Yld	DUPLICATE Result	Total Uncert. (2 σ +/-)	% Yld	QC Sample ID Precision
Carbon 14 by EERF C-01-1			pCi/g	C-01-1			F9K300455-003
Carbon 14	1.70 J	0.72		2.24 J	0.77		27 %RPD
	Batch #:	9336123 (Sample)		9336123 (Duplicate)			

NOTE(S)

Data are incomplete without the case narrative.

Calculations are performed before rounding to avoid round-off error in calculated results

J Result is greater than sample detection limit but less than stated reporting limit.

MATRIX SPIKE REPORT

Radiochemistry

Client Lot Id: F9K300455
 Matrix: SOLID

Date Sampled: 11/06/09
 Date Received: 11/30/09

Parameter	Spike Amount	Spike Result	Total Uncert. (2σ +/-)	Spike Yld.	Sample Result	Total Uncert. (2 σ +/-)	QC Sample ID		QC Control Limits
							%YLD	%REC	
Carbon 14 by EERF C-01-1			pCi/g		C-01-1				F9K300455-003
Carbon 14	291	246	21		1.70	0.72		84	(78 - 110)
	Batch #:	9336123		Analysis Date:	12/03/09				

NOTE(S)

Data are incomplete without the case narrative.

Calculations are performed before rounding to avoid round-off errors in calculated results.

REANALYSIS / SUB-CONTRACT / CLIENT RETURN FORM

Request Initiated by: Clay
 Request Date: 11-30-09
 Quote Number: _____
 Client Number: 84478
 SDG Number: _____

Request is for (check one):

- ☐ Return to Client – (Client FedEx #)
☐ Reanalysis
☐ Sub-Contract Sample
☒ Additional Analysis

New Lot (check one):

- ☒ Yes
☐ No

Old Lot Number: F9K110458

Client ID	Sampled date/time*	Shelf Location	Line item from quote (include Rad Screen if required)
See Attached			C-14

* or attach original Chain of Custody

Due Date for New Login:

Analytical
12-04-09

Report
12-07-09

For Sub-Contract or Return to Client ONLY

Shipping Address: _____

Contact Person: _____
 Phone Number: _____

Project Manager Signature: _____

DO NOT HAVE LAB PULL ORIGINAL SAMPLE

Completed by: Angela Boon

Date: 11-30-09

New Login Lot Number: F9K300 455 (place copy of this form in old file)

Initial that Containers were Re-labeled: AB (place below lot number of old label)

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING

CD 38

Chain of Custody Record

America Connecticut
 10 Hill Cross Road
 1, CT 06484
 (203) 929-8140 Fax (203) 929-8142

Information (Sub Contract Lab)

Lab PM: **Arasate, Erin A**
 E-Mail: **erin.arasate@testamericainc.com**

Carrier Tracking No(s):
 Page 1 of 2
 Job #:

Analysis Requested

Due Date Requested: 11/25/2009
 TAT Requested (days):

PO #: 3045
 WO #:

Project #: 22002640
 SSOW#:

City: Rider Trail North

PO #: 3045

8-8568(Tel) 314-298-8757(Fax)

Name: 3, KS

Matrix (Non-Hazardous, Hazardous, Other)

Sample Type (C=Comp, G=Grab)

Sample Time

Sample Date

ES-SU009-S-01

ES-SU009-S-02

ES-SU009-S-03

ES-SU009-S-04

ES-SU009-S-05

ES-SU009-S-11

ES-SU009-S-12

ES-SU009-S-17

ES-SU009-S-19

ES-SU009-S-20

ES-SU009-S-26

Subcontract/DOE H3, H4, RC, Tritium

Special Instructions/Note:

2506

each

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Archive For Months

Special Instructions/QC Requirements:

Method of Shipment:

Received by: **Erin Arasate**

Date/Time: 11-10-09 1700

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

CR-38

Chain of Custody Record

America Connecticut
10 Hill Cross Road
Farmington, CT 06484
(203) 928-8140 Fax (203) 929-8142

Information (Sub Contract Lab)

Lab ID: 22002640
Project #: 1, KS
SSOW#:

Sampler:

Lab PM:

Arasate, Erin A

E-Mail: erin.arasate@testamerica.com

Carrier Tracking No(s):

COC No:

220-4471.2

Page 2 of 2

ig/Receiving

erica Laboratories, Inc.

Rider Trail North,

City:

State:

Zip:

PO #:

WO #:

Project #:

22002640

SSOW#:

Analysis Requested

Preservation Codes:
A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
Other:
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - ph 4-5
Z - other (specify)

Identification - Client ID

ES-SU009-S-30
ES-SU009-S-32
ES-SU009-S-36
ES-SU009-S-36 A

Sample Date

11/6/09
11/6/09
11/6/09
11/6/09

Sample Time

10:55
11:25
11:10
11:10

Sample Type (C=Comp, G=grab)

Solid
Solid
Solid
Solid

Matrix (W=Water, S=Sediment, O=Other, etc.)

Solid
Solid
Solid
Solid

Special Instructions/Note:

SUBCONTRACT/DOE H3_04 RC - Tidium

Table Hazard Identification

Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological ☐

Sample Requested: I, II, III, IV, Other (specify)

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return To Client ☐ Disposal By Lab ☐ Archive For ☐ Months

Special Instructions/QC Requirements:

Kit Relinquished by:

Date:

Company

Date/Time:

11-10-09

Company

Date/Time:

11-10-09

Company

Date/Time:

11-10-09

Company

Date/Time:

11-10-09

Study Seals Intact:

Yes ☐ No ☐

Custody Seal No.:

12/08/2009

26 of 27

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Lot #(s):

F9K110455

CONDITION UPON RECEIPT FORM

Client: JA CannQuote No: 84476COC/RFA No: 220-4471.1/220-4471.2

38

Initiated By: CRDate: 11/11/09Time: 0910

Shipping Information

Shipper: FedEx UPS DHL Courier Client Other: _____Multiple Packages: Y (N)

Shipping # (s):*

Sample Temperature (s):**

1. <u>4220 7055 0386</u>	6. _____	1. <u>ambient</u>	6. _____
2. _____	7. _____	2. _____	7. _____
3. _____	8. _____	3. _____	8. _____
4. _____	9. _____	4. _____	9. _____
5. _____	10. _____	5. _____	10. _____

*Numbered shipping lines correspond to Numbered Sample Temp lines

**Sample must be received at 4°C ± 2°C- If not, note contents below. Temperature variance does NOT affect the following: Metals-Liquid or Rad tests- Liquid or Solids

Condition (Circle "Y" for yes, "N" for no and "N/A" for not applicable):

1. <u>(Y)</u> N	Are there custody seals present on the cooler?	8. Y <u>(N)</u>	Are there custody seals present on bottles?
2. Y <u>(N)</u> N/A	Do custody seals on cooler appear to be tampered with?	9. Y N <u>(N/A)</u>	Do custody seals on bottles appear to be tampered with?
3. <u>(Y)</u> N	Were contents of cooler frisked after opening, but before unpacking?	10. Y N <u>(N/A)</u>	Was sample received with proper pH? (If not, make note below)
4. <u>(Y)</u> N	Sample received with Chain of Custody?	11. <u>(Y)</u> N	Sample received in proper containers?
5. <u>(Y)</u> N N/A	Does the Chain of Custody match sample ID's on the container(s)?	12. Y N <u>(N/A)</u>	Headspace in VOA or TOX liquid samples? (If Yes, note sample ID's below)
*6. <u>(Y)</u> N	Was sample received broken?	13. Y N <u>(N/A)</u>	Was Internal COC/Workshare received?
7. <u>(Y)</u> N	Is sample volume sufficient for analysis?	14. Y N <u>(N/A)</u>	Was pH taken by original TestAmerica lab?

* For DOE-AL (Pantex, LANL, Sandia) sites, pH of ALL containers received must be verified, EXCEPT VOA, TOX and soils.

Notes:

* ES-5009-S-03
received broken
put in 500 G

Carton - 14 analysis added 11-30-09

Corrective Action:

☐ Client Contact Name: _____
☐ Sample(s) processed "as is"
☐ Sample(s) on hold until: _____
 Project Management Review: CS

Informed by: _____

If released, notify: _____
 Date: 11-16-09

THIS FORM MUST BE COMPLETED AT THE TIME THE ITEMS ARE BEING CHECKED IN. IF ANY ITEM IS COMPLETED BY SOMEONE OTHER THAN THE INITIATOR, THEN THAT PERSON IS REQUIRED TO APPLY THEIR INITIAL AND THE DATE NEXT TO THAT ITEM.

ADMIN-0004, REVISED 10/21/08 \\slsvr01\QA\FORMS\ST-LOUIS\ADMIN\Admin004 rev11.doc

MISCELLANEOUS DOCUMENTS

Chain of Custody Record

Client Contact: John Davis		Field Sampler: Chuck Owens		TAT Required (business days):		Lab PM/Contact:		COC Number: 12420	
Company: ENERGY SOLUTIONS		Mobile/Field Number: (865) 310-2362		Deliverable Type (Report/EDD):		Lab Job Number (Lab Use Only):		Page 1 of 2	
Address: 13605 West 96th Terrace		E-Mail: CLowens@energy.com		Sample Disposal: <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Passed Rad Screen (Lab Use Only):		Carrier Tracking	
City, State, Zip: LENEXA, KS 66215		PO #: 765-7112		Archive for 12 Months (A fee may be assessed if samples are retained for longer than 1 month)		Cooler Temperatures (Lab Use Only):		Notes:	
Phone: (865) 765-7112		WO #: 7112		Project #:		Analysis (Attach list if more space is needed)			
Email: JDavis@EnergySolutions.com		SSOW#:		State Regulatory QC Criteria Requirements:					
Project Name/Location (State): Energy Solutions, KS				No. of Containers/Preservatives					
Field Sample Identification		Collection Date		Collection Time (24-Hour Clock)		Matrix		MS/MSD (Yes or No)	
(Containers for each sample may be combined on one line)						Aq-Aqueous, S-Solid, W-Waste/Oil, O-Other			
TA #									
1	ES-54009-S-01	11/6/09	0900	S	NO				
2	ES-54009-S-02	11/6/09	0910	S	NO				
3	ES-54009-S-03	11/6/09	0920	S	NO				
4	ES-54009-S-04	11/6/09	0930	S	NO				
5	ES-54009-S-05	11/6/09	0940	S	NO				
6	ES-54009-S-11	11/6/09	0955	S	NO				
7	ES-54009-S-12	11/6/09	1005	S	NO				
8	ES-54009-S-17	11/6/09	1015	S	NO				
9	ES-54009-S-19	11/6/09	1025	S	NO				
10	ES-54009-S-20	11/6/09	1035	S	NO				
Requested by: John Davis		Date/Time: 11-06-2009/13:30		Company: ES		Received by: Chuck Owens		Date/Time: 11/6/09 1330	
Requested by: John Davis		Date/Time: 11/6/09 1400		Company: ES		Received by: Chuck Owens		Date/Time: 11-09-09 8156	
Requested by: John Davis		Date/Time:		Company:		Received by:		Date/Time:	
Comments: 0									

Chain of Custody Record

Client Contact: John Davis Company: Energy Solutions Address: 13605 West 96th Terrace City, State, Zip: Lenexa, KS 66215 Phone: (865) 765-7112 Email: jrdavis@energysol.com Project Name/Site Location (State): Eagle Creek / Lenexa, KS		Field Sampler: Chuck Owens Mobile/Field Number: (865) 310-2362 E-Mail: cdown@energysol.com PO #: WO #: Project #: SSOW#:		TAT Required (business days): 5 Days		Lab PM/Contact: Lab Job Number (Lab Use Only): 10654 Passed Rad Screen (Lab Use Only): <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Cooler Temperatures (Lab Use Only): 11.6°C IP-94H1		COC Number: 12421 Page 2 of 2 Carrier Tracking Notes:				
Field Sample Identification (Containers for each sample may be combined on one line)		Collection Date	Collection Time (24-Hour Clock)	Matrix Aq=Aqueous, S=Solid, W=Waste/Oil, O=Other	MS/ MSD (Yes or No)	No. of Containers/Preservatives			Analysis (Attach list if more space is needed)			Comments
TA #	Unpreserved	H2SO4	HNO3	HCL	NaOH	ZnAc/NaOH	Other					
1	ES-S4009-S-26	11/6/09	1045	S	NO	X						
2	ES-S4009-S-30	11/6/09	1055	S	NO	X						
3	ES-S4009-S-32	11/6/09	1125	S	NO	X						
4	ES-S4009-S-36	11/6/09	1110	S	NO	X						
5	ES-S4009-S-36A	11/6/09	1110	S	NO	X						
Relinquished by: [Signature]		Date/Time: 11-06-2009 / 13:30	Company: ES		Received by: [Signature]		Date/Time: 11/6/09 1330	Company: ES				
Relinquished by: [Signature]		Date/Time: 11/6/09 / 1400	Company: ES		Received by: [Signature]		Date/Time: 11-9-09 8:56	Company: TA				
Relinquished by:		Date/Time:	Company:		Received by:		Date/Time:	Company:				
Comments: 9												

Login Sample Receipt Check List

Client: Energy Solutions, LLC

Job Number: 220-10654-1

SDG Number: 220-10654

Login Number: 10654

List Source: TestAmerica Connecticut

Creator: Faiella, Tim

List Number: 1

Question	T / F / NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	
Cooler Temperature is recorded.	True	11.6C
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Is the Field Sampler's name present on COC?	True	
Sample Preservation Verified	N/A	



TestAmerica Laboratories, Inc.

ANALYTICAL REPORT


Lenexa, KS

Lot #: F9L090427

TestAmerica Connecticut

TestAmerica Connecticut
128 Long Hill Cross Road
Shelton, CT 06484

TESTAMERICA LABORATORIES, INC.


Kay Clay
Project Manager

December 16, 2009

METHODS SUMMARY

F9L090427

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>	<u>PREPARATION METHOD</u>
Carbon 14 by LSC	EERF C-01-1	
Percent Moisture	MCAWW 160.3 MOD	MCAWW 160.3 MOD
Tritium by LSC	EML H3-04-RC MO	

References:

EERF EERF

EML "ENVIRONMENTAL MEASUREMENTS LABORATORY PROCEDURES MANUAL"
HASL-300 28TH EDITION, VOLUME I and II DEPARTMENT OF ENERGYMCAWW "Methods for Chemical Analysis of Water and Wastes",
EPA-600/4-79-020, March 1983 and subsequent revisions.

SAMPLE SUMMARY

F9L090427

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
LQQQJ	001	ES-SU009-S-6 (220-10920-1)	12/03/09	07:00
LQQQ5	002	ES-SU009-S-7 (220-10920-2)	12/03/09	07:05
LQQQ8	003	ES-SU009-S-8 (220-10920-3)	12/03/09	07:10
LQQQ9	004	ES-SU009-S-9 (220-10920-4)	12/03/09	07:15
LQQRA	005	ES-SU009-S-10 (220-10920-5)	12/03/09	07:20
LQQRE	006	ES-SU009-S-13 (220-10920-6)	12/03/09	07:25
LQQRF	007	ES-SU009-S-16 (220-10920-7)	12/03/09	07:30
LQQRG	008	ES-SU009-S-23 (220-10920-8)	12/03/09	07:35
LQQRJ	009	ES-SU009-S-24 (220-10920-9)	12/03/09	07:40
LQQRK	010	ES-SU009-S-25 (220-10920-10)	12/03/09	07:45
LQQRL	011	ES-SU009-S-27 (220-10920-11)	12/03/09	07:50
LQQRN	012	ES-SU009-S-28 (220-10920-12)	12/03/09	07:55
LQQRP	013	ES-SU009-S-29 (220-10920-13)	12/03/09	08:00
LQQRQ	014	ES-SU009-S-31 (220-10920-14)	12/03/09	08:05
LQQRR	015	ES-SU009-S-34 (220-10920-15)	12/03/09	08:10
LQQRT	016	ES-SU009-S-35 (220-10920-16)	12/03/09	08:15
LQQRV	017	ES-B-S-10 (220-10920-17)	12/03/09	

NOTE (S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Case Narrative
LOT NUMBER: F9L090427

This report contains the analytical results for the 17 samples received under chain of custody by TestAmerica St. Louis on December 9, 2009. These samples are associated with your Lenexa, KS project.

The analytical results included in this report meet all applicable quality control procedure requirements.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by TestAmerica St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. **TestAmerica St. Louis' Florida certification number is E87689.** The case narrative is an integral part of this report.

This report shall not be reproduced, except in full, without the written approval of the laboratory.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

There are no observations or nonconformances associated with the analysis in this lot.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-6 (220-10920-1)

Radiochemistry

Lab Sample ID: F9L090427-001
 Work Order: LQQQJ
 Matrix: SOLID

Date Collected: 12/03/09 0700
 Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343301	Yld %
Tritium	0.04	U	0.18	2.00	0.33	12/10/09	12/11/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	4.37	J	0.95	5.00	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-7 (220-10920-2)

Radiochemistry

Lab Sample ID: F9L090427-002
Work Order: LQQQ5
Matrix: SOLID

Date Collected: 12/03/09 0705
Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343301	Yld %
Tritium	-0.0007	U	0.18	2.00	0.33	12/10/09	12/11/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	9.2		1.3	5.0	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-8 (220-10920-3)

Radiochemistry

Lab Sample ID: F9L090427-003
 Work Order: LQQQ8
 Matrix: SOLID

Date Collected: 12/03/09 0710
 Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343301	Yld %
Tritium	-0.21	U	0.15	2.00	0.33	12/10/09	12/11/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	5.2		1.0	5.0	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-9 (220-10920-4)

Radiochemistry

Lab Sample ID: F9L090427-004
Work Order: LQQQ9
Matrix: SOLID

Date Collected: 12/03/09 0715
Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343301	Yld %
Tritium	-0.13	U	0.16	2.00	0.33	12/10/09	12/11/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	6.8		1.1	5.0	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-10 (220-10920-5)

Radiochemistry

Lab Sample ID: F9L090427-005

Date Collected: 12/03/09 0720

Work Order: LQORA

Date Received: 12/09/09 0910

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343301	Yld %
Tritium	0.02	U	0.19	2.00	0.33	12/10/09	12/11/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	1.86	J	0.78	5.00	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-13 (220-10920-6)

Radiochemistry

Lab Sample ID: F9L090427-006
 Work Order: LQQRE
 Matrix: SOLID

Date Collected: 12/03/09 0725
 Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343301	Yld %
Tritium	-0.05	U	0.18	2.00	0.34	12/10/09	12/11/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	1.99	J	0.78	5.00	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-16 (220-10920-7)

Radiochemistry

Lab Sample ID: F9L090427-007
 Work Order: LQORF
 Matrix: SOLID

Date Collected: 12/03/09 0730
 Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343301	Yld %
Tritium	6.21		0.67	2.00	0.32	12/10/09	12/11/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	0.38	U	0.65	5.00	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-23 (220-10920-8)

Radiochemistry

Lab Sample ID: F9L090427-008
 Work Order: LQQRG
 Matrix: SOLID

Date Collected: 12/03/09 0735
 Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343301	Yld %
Tritium	1.16	J	0.30	2.00	0.32	12/10/09	12/11/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	0.28	U	0.65	5.00	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-24 (220-10920-9)

Radiochemistry

Lab Sample ID: F9L090427-009
 Work Order: LQQRJ
 Matrix: SOLID

Date Collected: 12/03/09 0740
 Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343301	Yld %
Tritium	0.22	U	0.21	2.00	0.33	12/10/09	12/11/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	1.20	J	0.72	5.00	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-25 (220-10920-10)

Radiochemistry

Lab Sample ID: F9L090427-010
 Work Order: LQQRK
 Matrix: SOLID

Date Collected: 12/03/09 0745
 Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343301	Yld %
Tritium	0.07	U	0.19	2.00	0.32	12/10/09	12/11/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	4.68	J	0.99	5.00	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-27 (220-10920-11)

Radiochemistry

Lab Sample ID: F9L090427-011

Date Collected: 12/03/09 0750

Work Order: LQQRL

Date Received: 12/09/09 0910

Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343302	Yld %
Tritium	0.39	J	0.21	2.00	0.29	12/11/09	12/12/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	0.69	U	0.67	5.00	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-28 (220-10920-12)

Radiochemistry

Lab Sample ID: F9L090427-012
 Work Order: LQQRN
 Matrix: SOLID

Date Collected: 12/03/09 0755
 Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343302	Yld %
Tritium	0.91	J	0.26	2.00	0.28	12/11/09	12/12/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	0.17	U	0.65	5.00	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-29 (220-10920-13)

Radiochemistry

Lab Sample ID: F9L090427-013
 Work Order: LQORP
 Matrix: SOLID

Date Collected: 12/03/09 0800
 Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343302	Yld %
Tritium	0.79	J	0.25	2.00	0.29	12/11/09	12/12/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	0.41	U	0.66	5.00	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

- Result is less than the sample detection limit

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-31 (220-10920-14)

Radiochemistry

Lab Sample ID: F9L090427-014
 Work Order: LQQRQ
 Matrix: SOLID

Date Collected: 12/03/09 0805
 Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343302	Yld %
Tritium	-0.09	U	0.15	2.00	0.31	12/11/09	12/12/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	3.56	J	0.91	5.00	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-34 (220-10920-15)

Radiochemistry

Lab Sample ID: F9L090427-015
 Work Order: LQORR
 Matrix: SOLID

Date Collected: 12/03/09 0810
 Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343302	Yld %
Tritium	-0.06	U	0.16	2.00	0.31	12/11/09	12/12/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	1.90	J	0.77	5.00	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-SU009-S-35 (220-10920-16)

Radiochemistry

Lab Sample ID: F9L090427-016
Work Order: LQQRT
Matrix: SOLID

Date Collected: 12/03/09 0815
Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343302	Yld %
Tritium	0.06	U	0.17	2.00	0.30	12/11/09	12/12/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	0.67	U	0.68	5.00	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

TestAmerica Connecticut

Client Sample ID: ES-B-S-10 (220-10920-17)

Radiochemistry

Lab Sample ID: F9L090427-017
 Work Order: LQQRV
 Matrix: SOLID

Date Collected: 12/03/09 0000
 Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	mdc	Prep Date	Analysis Date
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g		Batch # 9343302	Yld %
Tritium	0.11	U	0.17	2.00	0.29	12/11/09	12/12/09
<hr/>							
Carbon 14 by EERF C-01-1				pCi/g		Batch # 9345145	Yld %
Carbon 14	5.4		1.0	5.0	1.1	12/11/09	12/12/09
<hr/>							

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

METHOD BLANK REPORT

Radiochemistry

Client Lot ID: F9L090427
 Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ +/-)	RL	MDC	Prep Date	Lab Sample ID Analysis Date
Tritium by LSC by DOE H3-04-RC MOD.							
Tritium	-0.12	U	0.14	2.00	0.28	12/10/09	F9L090000-301B 12/11/09
Tritium by LSC by DOE H3-04-RC MOD.							
Tritium	0.06	U	0.15	2.00	0.25	12/11/09	F9L090000-302B 12/12/09
Carbon 14 by EERF C-01-1							
Carbon 14	0.47	U	0.67	5.00	1.1	12/11/09	F9L110000-145B 12/12/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only

Bold results are greater than the MDC.

U Result is less than the sample detection limit.

Laboratory Control Sample Report

Radiochemistry

Client Lot ID: F9L090427
 Matrix: SOLID

Parameter	Spike Amount	Result	Total Uncert. (2 σ +/-)	MDC	% Yld	% Rec	Lab Sample ID QC Control Limits
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.			pCi/g	H3-04-RC MOD			F9L090000-301C
Tritium	15.3	15.7	1.2	0.3		103	(75 - 104)
	Batch #:	9343301		Analysis Date:	12/11/09		
<hr/>							
Tritium by LSC by DOE H3-04-RC MOD.			pCi/g	H3-04-RC MOD			F9L090000-302C
Tritium	15.2	15.8	1.2	0.3		104	(75 - 104)
	Batch #:	9343302		Analysis Date:	12/12/09		
<hr/>							
Carbon 14 by EERF C-01-1			pCi/g	C-01-1			F9L110000-145C
Carbon 14	73.2	62.0	5.3	1.1		85	(62 - 109)
	Batch #:	9345145		Analysis Date:	12/12/09		
<hr/>							

NOTE(S)

MDC is determined by instrument performance only

DUPLICATE EVALUATION REPORT

Radiochemistry

Client Lot ID: F9L090427
Matrix: SOLID

Date Sampled: 12/03/09
Date Received: 12/09/09

Parameter	SAMPLE Result		Total Uncert. (2σ +/-)	% Yld	DUPLICATE Result	Total Uncert. (2σ +/-)	% Yld	QC Sample ID Precision
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g	H3-04-RC MOD			F9L090427-001
Tritium	0.04 U		0.18		-0.10 U	0.17		421 %RPD
	Batch #:		9343301 (Sample)		9343301 (Duplicate)			
Tritium by LSC by DOE H3-04-RC MOD.				pCi/g	H3-04-RC MOD			F9L090427-011
Tritium	0.39 J		0.21		0.26 U	0.20		38 %RPD
	Batch #:		9343302 (Sample)		9343302 (Duplicate)			
Carbon 14 by EERF C-01-1				pCi/g	C-01-1			F9L090427-011
Carbon 14	0.69 U		0.67		0.57 U	0.68		20 %RPD
	Batch #:		9345145 (Sample)		9345145 (Duplicate)			

NOTE(S)

Data are incomplete without the case narrative.

Calculations are performed before rounding to avoid round-off error in calculated results

J Result is greater than sample detection limit but less than stated reporting limit.

MATRIX SPIKE REPORT

Radiochemistry

Client Lot Id: F9L090427
 Matrix: SOLID

Date Sampled: 12/03/09
 Date Received: 12/09/09

Parameter	Spike Amount	Spike Result	Total Uncert. (2σ +/-)	Spike Yld.	Sample Result	Total Uncert. (2 σ +/-)	QC Sample ID		QC Control Limits
							%YLD	%REC	
Tritium by LSC by DOE H3-04-RC MOD.			pCi/g	H3-04-RC MOD			F9L090427-002		
Tritium	15.2	19.1	1.5		-0.0007	0.18	126		(62 - 129)
	Batch #:	9343301		Analysis Date:	12/11/09				
Carbon 14 by EERF C-01-1			pCi/g	C-01-1			F9L090427-011		
Carbon 14	293	241	21		0.69	0.67	82		(78 - 110)
	Batch #:	9345145		Analysis Date:	12/12/09				
Tritium by LSC by DOE H3-04-RC MOD.			pCi/g	H3-04-RC MOD			F9L090427-012		
Tritium	15.1	20.1	1.5		0.91	0.26	127		(62 - 129)
	Batch #:	9343302		Analysis Date:	12/12/09				

NOTE(S)

Data are incomplete without the case narrative.

Calculations are performed before rounding to avoid round-off errors in calculated results.

TestAmerica Connecticut

28 Long Hill Cross Road

Helmton, CT 06484

Phone (203) 929-8140 Fax (203) 929-8142

Chain of Custody Record

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab) Client Contact: _____ Shipping/Receiving: _____ Company: _____ Address: 3715 Rider Trail North, City: Earth City State, Zip: MO, 63045 Phone: 14-298-8566(Tel) 314-298-8757(Fax) Mail: _____ Project Name: _____ Project #: 22002840 SOW#: _____		Lab PM: _____ Arasate, Erin A E-Mail: erin.arasate@testamericainc.com Phone: _____		Carrier Tracking No(s): _____ COC No: 220-4645-1 Page: Page 1 of 2 Job #: 220-10920-1	
Analysis Requested Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2OHS E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Anchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Z - other (specify) Other: _____					
Due Date Requested: 12/16/2009 TAT Requested (days): _____		Total Number of Containers: _____			
Sample Date 12/3/09		Sample Time 7:00		Matrix (W=water, S=solid, O=oil, A=air) Solid	
Sample Identification - Client ID (Lab ID) ES-SU009-S-6 (220-10920-1)		Sample Type (C=Comp, G=grab) Solid		Field/Filtered Sample (Yes/No) X	
ES-SU009-S-7 (220-10920-2)		Solid		SUBCONTRACT/DOE H3_04_RC - Tritium X	
ES-SU009-S-8 (220-10920-3)		Solid		SUBCONTRACT/DOE H3_04_RC - Carbon 14 X	
ES-SU009-S-9 (220-10920-4)		Solid		Performance MS/MSD (Yes/No) X	
ES-SU009-S-10 (220-10920-5)		Solid		X	
ES-SU009-S-13 (220-10920-6)		Solid		X	
ES-SU009-S-16 (220-10920-7)		Solid		X	
ES-SU009-S-23 (220-10920-8)		Solid		X	
ES-SU009-S-24 (220-10920-9)		Solid		X	
ES-SU009-S-25 (220-10920-10)		Solid		X	
ES-SU009-S-27 (220-10920-11)		Solid		X	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV, Other (specify) _____					
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months					
Special Instructions/QC Requirements: _____					
Empty Kit Relinquished by: _____		Date: _____		Method of Shipment: _____	
Relinquished by: _____		Date/Time: 12/8/09 1507		Received by: _____	
Relinquished by: _____		Date/Time: _____		Received by: _____	
Relinquished by: _____		Date/Time: _____		Received by: _____	
Custody Seals Intact: Δ Yes Δ No		Cooler Temperature(s) °C and Other Remarks: _____			

estAmerica Connecticut
28 Long Hill Cross Road
Helm, CT 06484
Phone (203) 929-8140 Fax (203) 929-8142

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica St. Louis

Client Information (Sub Contract Lab)		Lab PM: Arasate, Erin A		Carrier Tracking No(s):		COC No: 220-4645-2	
Client Contact: erin.arasate@testamericainc.com		E-Mail: erin.arasate@testamericainc.com		Page 2 of 2		Page 2 of 2	
Company: esAmerica Laboratories, Inc.		Address: 3715 Rider Trail North,		City: earth City		State, Zip: MO, 63045	
Phone: 14-298-8566(Tel) 314-298-8757(Fax)		PO #:		WO #:		Project #: 22002640	
Project Name: enexa, KS		SSOW#:		Due Date Requested: 12/16/2009		TAT Requested (days):	
Sample Identification - Client ID (Lab ID)		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)	
Matrix (W=water, S=solid, O=oil, A=air)		Preservation Code		Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)	
SUBCONTRACT/ DOE H3_04_RC - Tritium		SUBCONTRACT/ C-01-1 - Carbon 14		Total Number of Containers		Special Instructions/Note:	
ES-SU009-S-28 (220-10920-12)		12/3/09		7:55		Solid	
ES-SU009-S-29 (220-10920-13)		12/3/09		8:00		Solid	
ES-SU009-S-31 (220-10920-14)		12/3/09		8:05		Solid	
ES-SU009-S-34 (220-10920-15)		12/3/09		8:10		Solid	
ES-SU009-S-35 (220-10920-16)		12/3/09		8:15		Solid	
ES-B-S-10 (220-10920-17)		12/3/09				Solid	
Possible Hazard Identification		Non-Hazard		Flammable		Skin Irritant	
Deliverable Requested: I, II, III, IV, Other (specify)		Poison B		Unknown		Radiological	
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:	
Relinquished by: H. Bloer		Date/Time: 12/8/09 1507		Company: TH CT		Received by: Arasate, Erin A	
Relinquished by:		Date/Time:		Company:		Received by:	
Relinquished by:		Date/Time:		Company:		Received by:	
Custody Seals Intact: Yes No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:			

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Lot #(s): 776070421

CONDITION UPON RECEIPT FORM

Client: FACTQuote No: 84478COC/RFA No: 020-4645.1

324

Initiated By: AMSDate: 12-9-09Time: 9:10

Shipping Information

Shipper: FedEx

UPS

DHL

Courier

Client

Other: _____

Multiple Packages: Y (N)

Shipping # (s):*

Sample Temperature (s):**

1. **FedEx** **PRIORITY**

2. Emp# 594618 01:14 09DEC09

3. 4220 7055 2805

4.

5.

6.

7.

8.

9.

10.

1. Ambient

2.

3.

4.

5.

6.

7.

8.

9.

10.

*Numbered shipping lines correspond to Numbered Sample Temp lines

**Sample must be received at 4°C ± 2°C- If not, note contents below. Temperature variance does NOT affect the following: Metals-Liquid or Rad tests- Liquid or Solids

Condition (Circle "Y" for yes, "N" for no and "N/A" for not applicable):

1. <u>(Y)</u> N	Are there custody seals present on the cooler?	8. Y <u>(N)</u>	Are there custody seals present on bottles?
2. Y <u>(N)</u> N/A	Do custody seals on cooler appear to be tampered with?	9. Y N <u>(N/A)</u>	Do custody seals on bottles appear to be tampered with?
3. <u>(Y)</u> N	Were contents of cooler frisked after opening, but before unpacking?	10. Y N <u>(N/A)</u>	Was sample received with proper pH? (If not, make note below)
4. <u>(Y)</u> N	Sample received with Chain of Custody?	11. <u>(Y)</u> N	Sample received in proper containers?
5. <u>(Y)</u> N N/A	Does the Chain of Custody match sample ID's on the container(s)?	12. Y N <u>(N/A)</u>	Headspace in VOA or TOX liquid samples? (If Yes, note sample ID's below)
6. Y <u>(N)</u>	Was sample received broken?	13. <u>(Y)</u> N <u>(N/A)</u>	Was Internal COC/Workshare received?
7. <u>(Y)</u> N	Is sample volume sufficient for analysis?	14. Y N <u>(N/A)</u>	Was pH taken by original TestAmerica lab?

* For DOE-AL (Pantex, LANL, Sandia) sites, pH of ALL containers received must be verified, EXCEPT VOA, TOX and soils.

Notes:

Corrective Action:

☐ Client Contact Name: _____

Informed by: _____

☐ Sample(s) processed "as is"☐ Sample(s) on hold until: _____

If released, notify: _____

Project Management Review: K. DayDate: 12-16-09

THIS FORM MUST BE COMPLETED AT THE TIME THE ITEMS ARE BEING CHECKED IN. IF ANY ITEM IS COMPLETED BY SOMEONE OTHER THAN THE INITIATOR, THEN THAT PERSON IS REQUIRED TO APPLY THEIR INITIAL AND THE DATE NEXT TO THAT ITEM.

ADMIN-0004, REVISED 10/21/08 \\slsvr01\QA\FORMS\ST-LOUIS\ADMIN\Admin004 rev11.doc

ENERGY SOLUTIONS, LLC

Kansas Site

**STANDARD LEVEL IV
REPORT OF ANALYSIS**

WORK ORDER #09-11114-OR

December 8, 2009

**EBERLINE ANALYTICAL/OAK RIDGE LABORATORY
OAK RIDGE, TN**

TABLE OF CONTENTS

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Eberline Services – Oak Ridge Laboratory
LABORATORY DATA SUPPORT CHECKLIST
MP-001-3

Eberline Services Work Order # 09 111 14

The checklist items listed below are to be initialed by appropriate staff upon completion/verification.

Date for Partial	Initials	Date	Initials	Checklist Items
		11-25-09	KF	Sample Log-In
		12/1/09	KBS	Data Compilation
		12-1-09	MLT	First Technical Data Review
		12/1/09	NW	Second Technical Data Review
		12/3/09	GA	Data Entry/Electronic Deliverable
		12/3/09	GA	Case Narrative
		12/08/09	EYT	Electronic Deliverable Proof
		12/8/09	D.H.	Samples Analyzed within Holding Time Yes? <input type="checkbox"/> No? <input type="checkbox"/> <i>YES</i>
		12/8/09	D.H.	QA/QC Review
		11/27/09	MRM	Client in Possession of Data Electronic or Hard Copy
				Invoiced by Laboratory

Technical/Clerical Corrections, Signatures Needed, Problems, Etc	Date/Initials

Date package approved by:

Laboratory Manager

Date

Copy No. _____

Radiochemistry Services

SECTION I
CHAIN OF CUSTODY

TestAmerica Connecticut EBertine Analytical Mr. Mike McParrell
 128 Luning Hill Grove Road 601 Seneca Road
 Shelton, CT 06484 OAK Ridge, TN 37830
 Phone (203) 929-8140 Fax (203) 929-8142

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING

Client Contact: **JOHN DAVIS** Field Sampler: **RICHARD STONEY** COC Number: **12423**
 Company: **ENERGY SOLUTIONS** Mobile/Field Number: **09 111 14** Page **1** of **2**
 Address: **1009 Commerce Park Dr., Suite 100** Passed Rad Screen (Lab Use Only): **[] Yes [] No** Carrier Tracking
 City, State, Zip: **OAK RIDGE, TN 37830** Cooler Temperatures (Lab Use Only): **Notes:**
 Phone: **(865) 765-7112** State Regulatory QC Criteria Requirements: **Analysis (Attach list if more space is needed)**
 Email: **JR.DAVIS@ENERGYSOLUTIONS.COM**

TA#	Field Sample Identification (Containers for each sample may be combined on one line)	Collection Date	Collection Time (24-Hour Clock)	Matrix Aq=Aqueous S=Solid W=Wash/Oil O=Other	MS/MSD (Yes or No)	No. of Containers/Preservatives					Other	Comments
						Unpreserved	H2SO4	HNO3	HCL	NaOH	ZnAc/NaOH	
4	ES-SU009-S-15	11-24-09	0700	S	N							
5	ES-SU009-S-18	11-24-09	0710	S	N							
6	ES-SU009-S-21	11-24-09	0715	S	N							
7	ES-B-S-1	11-24-09	0720	S	N							
8	ES-B-S-2	11-24-09	0725	S	N							
9	ES-B-S-3	11-24-09	0730	S	N							
10	ES-B-S-4	11-24-09	0740	S	N							
11	ES-B-S-5	11-24-09	0745	S	N							
12	ES-B-S-6	11-24-09	0800	S	N							
13	ES-B-S-7	11-24-09	0810	S	N							

Relinquished by: **Richard P. Stoney** Date/Time: **11/24/09 1335** Company: **ES**
 Relinquished by: **Kevin Fox** Date/Time: **11/25/2009 1000** Company: **Eberline**
 Relinquished by: **Kevin Fox** Date/Time: **11/25/2009 1000** Company: **Eberline**

Comments: **RECEIVED NOV 25 2009 BY: KF**

THE LEADER IN ENVIRONMENTAL TESTING


[illegible]

DISTRIBUTION: WHITE - Slays with the Samples; CANARY - Returned to Client with Report; PINK - Field Copy

Field Sampling / Shipping Instructions and Laboratory Sample Receipt Policy included on Reverse Side of CQC


AT-0015 (0609)

Ans 2 of 2

 EBERLINE SERVICES Oak Ridge Laboratory	<h1>Internal Chain of Custody</h1>	Work Order #	09-11114
		Lab Deadline	11/30/2009
		Analysis	H0003 - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	44	D1.3
	05	49	D1.3
	06	36	D1.3
	07	43	D1.3
	08	56	D1.3
	09	49	D1.3
	10	45	D1.3
	11	41	D1.3
	12	40	D1.3
	13	31	D1.3
	14	53	D1.3
	15	42	D1.3

	Location (circle one)					Initials	Date
Received by	<u>Sample Storage</u>	Rough Prep	Prep	Separations	Count Room	<i>J. Schell</i>	11-25-09
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	<i>J. Schell</i>	11-25-09
Received by	Sample Storage	Rough Prep	Prep	Separations	<u>Count Room</u>	<i>PCB</i>	11/25/09 1240
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	<u>Count Room</u>	<i>Alan Ornel</i>	11/25/09 1000
Received by	<u>Sample Storage</u>	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

 EBERLINE SERVICES Oak Ridge Laboratory	<h1>Internal Chain of Custody</h1>	Work Order #	09-11114
		Lab Deadline	11/30/2009
		Analysis	C0014 - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	44	D1.3
	05	49	D1.3
	06	36	D1.3
	07	43	D1.3
	08	56	D1.3
	09	49	D1.3
	10	45	D1.3
	11	41	D1.3
	12	40	D1.3
	13	31	D1.3
	14	53	D1.3
	15	42	D1.3

	Location (circle one)					Initials	Date
Received by	<u>Sample Storage</u>	Rough Prep	Prep	Separations	Count Room	J. Achille	10:00 11-25-09
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	J. Achille	11-25-09
Received by	Sample Storage	Rough Prep	Prep	Separations	<u>Count Room</u>	ICB	11-25-09 12:40
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	<u>Count Room</u>	Shirley	11/25/09 10:00
Received by	<u>Sample Storage</u>	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

SECTION II
SAMPLE ACKNOWLEDGEMENT



EBERLINE
SERVICES

STANDARD OPERATING PROCEDURE

Sample Receiving

MP-001, Rev. 10
Effective: 4/27/09
Page 12 of 13

Eberline Services – Oak Ridge Laboratory

SAMPLE RECEIPT CHECKLIST

MP-001-2

WORK ORDER # 09 11114

SAMPLE MATRIX/MATRICES:

(CIRCLE ONE OR BOTH)

AQUEOUS NON-AQUEOUS

WERE SAMPLES:

(CIRCLE EITHER YES, NO, OR N/A)

Received in good condition?	<u>Y</u>	N	
If aqueous, properly preserved	Y	N	<u>N/A</u>

WERE CHAIN OF CUSTODY SEALS:

Present on outside of package?	<u>Y</u>	N
Unbroken on outside of package?	<u>Y</u>	N
Present on samples?	<u>Y</u>	N
Unbroken on samples?	<u>Y</u>	N
Was chain of custody present upon sample receipt?	<u>Y</u>	N

IF THE RESPONSE TO ANY OF THE ABOVE IS NO, A DISCREPANT SAMPLE RECEIPT REPORT (DSR) HAS BEEN ISSUED.

REMARKS:

12 soils glass jars

SIGNATURE: [Signature]

DATE: 11-25-09

Copy No. _____

Radiochemistry Services

SECTION III
CASE NARRATIVE



EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-29573

December 8, 2009

John Davis
Energy Solutions, LLC
1009 Commerce Park Drive #100
Oak Ridge, TN 37830

CASE NARRATIVE
Work Order # 09-11114-OR

SAMPLE RECEIPT

This work order contains twelve soil samples received 11/25/09. These samples were analyzed for Tritium and Carbon-14.

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>CLIENT ID</u>	<u>LAB ID</u>
ES-SU009-S-15	09-11114-04	ES-B-S-4	09-11114-10
ES-SU009-S-18	09-11114-05	ES-B-S-5	09-11114-11
ES-SU009-S-21	09-11114-06	ES-B-S-6	09-11114-12
ES-B-S-1	09-11114-07	ES-B-S-7	09-11114-13
ES-B-S-2	09-11114-08	ES-B-S-8	09-11114-14
ES-B-S-3	09-11114-09	ES-B-S-9	09-11114-15

ANALYTICAL METHODS

Tritium was performed using Method LANL ER-210 Modified. Carbon-14 was performed using EPA Method 520.0 Modified.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 2-sigma value.

TRITIUM

Representative aliquots of samples were oxidized using a Harvey Oxidizer. Tritium was captured during oxidization in a selective scintillation cocktail. Samples were then counted by beta liquid scintillation.

Samples demonstrated non-detect equivalent to only slightly positive results for Tritium activity. Results for the Tritium method blank demonstrated non-detect equivalent activity. Results for the Tritium replicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Tritium laboratory control sample demonstrated an acceptable percent recovery.

ANALYTICAL RESULTS CONTINUED

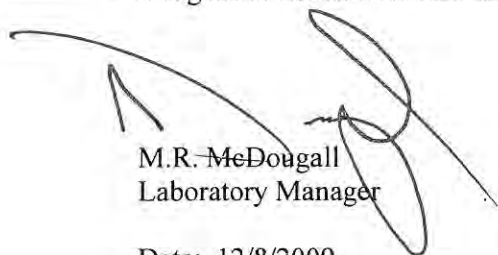
CARBON-14

Aliquots from samples, as received, were high temperature oxidized using a Harvey Oxidizer. Carbon-14 emissions from the oxidization process were selectively extracted into scintillation cocktail. Samples were then counted by beta liquid scintillation using energy specific windows to encompass Carbon-14 energies emitted. Samples were then spiked with a NIST traceable Carbon-14 standard and recounted for efficiency determinations.

Samples demonstrated non-detect equivalent to slightly positive results for Carbon-14 activity. Results for the Carbon-14 method blank demonstrated non-detect equivalent activity. Results for the Carbon-14 replicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Carbon-14 laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.



M.R. McDougall
Laboratory Manager

Date: 12/8/2009

SECTION IV
ANALYTICAL RESULTS SUMMARY

Eberline Analytical Final Report of Analysis				Report To:		Work Order Details							
John Davis Energy Solutions, LLC 1009 Commerce Park Drive #100 Oak Ridge, TN 37830				SDG:		09-11114							
				Purchase Order:		313104							
				Analysis Category:		ENVIRONMENTAL							
				Sample Matrix:		SO							
Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
09-11114-01	LCS	KNOWN	11/25/09 00:00	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	3.65E+02	1.02E+01			pCi/g
09-11114-01	LCS	SPIKE	11/25/09 00:00	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	3.84E+02	5.85E+00	5.88E+00	2.69E+00	pCi/g
09-11114-02	MBL	BLANK	11/25/09 00:00	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	6.43E-01	1.58E+00	1.58E+00	2.68E+00	pCi/g
09-11114-03	DUP	ES-SU009-S-15	11/24/09 07:00	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	-1.22E+00	1.44E+00	1.44E+00	2.53E+00	pCi/g
09-11114-04	DO	ES-SU009-S-15	11/24/09 07:00	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	-6.38E-01	1.53E+00	1.53E+00	2.66E+00	pCi/g
09-11114-05	TRG	ES-SU009-S-18	11/24/09 07:10	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	-1.62E+00	1.27E+00	1.27E+00	2.26E+00	pCi/g
09-11114-06	TRG	ES-SU009-S-21	11/24/09 07:15	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	2.40E+01	1.96E+00	1.96E+00	2.45E+00	pCi/g
09-11114-07	TRG	ES-B-S-1	11/24/09 07:20	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	-1.21E+00	1.43E+00	1.43E+00	2.52E+00	pCi/g
09-11114-08	TRG	ES-B-S-2	11/24/09 07:25	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	-2.48E+00	1.44E+00	1.44E+00	2.58E+00	pCi/g
09-11114-09	TRG	ES-B-S-3	11/24/09 07:30	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	-2.27E+00	1.31E+00	1.31E+00	2.36E+00	pCi/g
09-11114-10	TRG	ES-B-S-4	11/24/09 07:40	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	-2.34E+00	1.36E+00	1.36E+00	2.44E+00	pCi/g
09-11114-11	TRG	ES-B-S-5	11/24/09 07:45	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	1.77E+00	1.48E+00	1.48E+00	2.47E+00	pCi/g
09-11114-12	TRG	ES-B-S-6	11/24/09 08:00	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	-5.99E-01	1.44E+00	1.44E+00	2.50E+00	pCi/g
09-11114-13	TRG	ES-B-S-7	11/24/09 08:10	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	-3.04E+00	1.40E+00	1.40E+00	2.54E+00	pCi/g
09-11114-14	TRG	ES-B-S-8	11/24/09 08:15	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified	-1.21E+00	1.44E+00	1.44E+00	2.52E+00	pCi/g
09-11114-15	TRG	ES-B-S-9	11/24/09 08:30	11/25/2009	11/25/2009	09-11114	Carbon-14	EPA 520.0 Modified					
09-11114-01	LCS	KNOWN	11/25/09 00:00	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	3.55E+02	1.28E+01			pCi/g
09-11114-01	LCS	SPIKE	11/25/09 00:00	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	3.45E+02	9.55E+00	3.94E+01	5.19E+00	pCi/g
09-11114-02	MBL	BLANK	11/25/09 00:00	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	3.55E+00	2.98E+00	3.01E+00	4.95E+00	pCi/g
09-11114-03	DUP	ES-SU009-S-15	11/24/09 07:00	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	5.24E+00	2.99E+00	3.05E+00	4.86E+00	pCi/g
09-11114-04	DO	ES-SU009-S-15	11/24/09 07:00	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	9.51E+00	3.40E+00	3.56E+00	5.30E+00	pCi/g
09-11114-05	TRG	ES-SU009-S-18	11/24/09 07:10	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	1.29E+01	3.06E+00	3.38E+00	4.50E+00	pCi/g
09-11114-06	TRG	ES-SU009-S-21	11/24/09 07:15	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	1.51E+01	3.24E+00	3.65E+00	4.68E+00	pCi/g
09-11114-07	TRG	ES-B-S-1	11/24/09 07:20	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	1.24E+01	3.30E+00	3.57E+00	4.94E+00	pCi/g
09-11114-08	TRG	ES-B-S-2	11/24/09 07:25	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	1.12E+02	5.92E+00	1.38E+01	5.12E+00	pCi/g
09-11114-09	TRG	ES-B-S-3	11/24/09 07:30	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	2.24E+01	3.78E+00	4.52E+00	5.20E+00	pCi/g
09-11114-10	TRG	ES-B-S-4	11/24/09 07:40	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	4.99E+00	2.85E+00	2.91E+00	4.63E+00	pCi/g
09-11114-11	TRG	ES-B-S-5	11/24/09 07:45	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	1.24E+01	3.31E+00	3.58E+00	4.95E+00	pCi/g
09-11114-12	TRG	ES-B-S-6	11/24/09 08:00	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	1.10E+01	3.34E+00	3.56E+00	5.10E+00	pCi/g
09-11114-13	TRG	ES-B-S-7	11/24/09 08:10	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	1.07E+01	3.27E+00	3.48E+00	4.99E+00	pCi/g
09-11114-14	TRG	ES-B-S-8	11/24/09 08:15	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	7.35E+00	3.22E+00	3.32E+00	5.12E+00	pCi/g
09-11114-15	TRG	ES-B-S-9	11/24/09 08:30	11/25/2009	11/25/2009	09-11114	Tritium	LANL ER-210 Modified	1.29E+01	3.42E+00	3.71E+00	5.12E+00	pCi/g

CU=Counting Uncertainty; CSU=Combined Standard Uncertainty; MDA=Minimal Detected Activity; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original


EBERLINE
SERVICES

EBERLINE ANALYTICAL CORPORATION

601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

SECTION V
ANALYTICAL STANDARD

H-5

CERTIFICATE OF CALIBRATION BETA STANDARD SOLUTION



Radionuclide: H-3
Half Life: 12.35 \pm 0.1 years
Catalog No.: 7003
Source No.: 660-25
Customer: THERMO NUTECH
P.O.No.: 5108
Reference Date: 15 Apr 99 12:00 PST.
Contained Radioactivity: 99.61 μ Ci (3686 kBq)

Description of Solution

- a. Mass of solution: 4.91974 grams in 5 mL flame sealed ampoule
- b. Chemical form: Tritiated water
- c. Carrier content: Not applicable
- d. Density: 0.9982 gram/mL @ 20°C.

Radioimpurities

None detected

Radioactive Daughters

None

Radionuclide Concentration

20.25 μ Ci/gram

Method of Calibration

This source was prepared from a weighed aliquot of solution whose concentration in μ Ci/gram was determined by a liquid scintillation counter.

Uncertainty of Measurement

- a. Systematic uncertainty in instrument calibration: $\pm 3.0\%$
- b. Random uncertainty in assay: $\pm 1.9\%$
- c. Random uncertainty in weighing(s): $\pm 0.0\%$
- d. Total uncertainty at the 99% confidence level: $\pm 3.6\%$

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials. (As in NRC Regulatory Guide 4.15)



ISOTOPE PRODUCTS LABORATORIES

1800 N. KEYSTONE STREET
BURBANK, CALIFORNIA 91504

818-843-7000 FAX 818-843-6168

Am U Khan
QUALITY CONTROL

2 Apr 99
Date Signed

Eberline Services



QUALITY CONTROL PROGRAM

QCP-009

Rev.8; 11/01/03

Title: Radioactive Reference Standards Solutions & Records

Eberline Services - OAK RIDGE LABORATORY RADIOACTIVE REFERENCE SOLUTIONS PRIMARY DILUTION (RECERTIFICATION) QCP 009-1

SOLUTION REFERENCE #		IPL 660-25	CURRENT DATE	01/05/09
SOLUTION #		H-5		
Principal Radionuclide	Half Life, Years	Half Life, Days		
^3H	1.235E+01	4.511E+03		
Radionuclide	^3H	Reference Date	4/15/1999 0:00	
Certified Activity	9.961E+01 μCi			
Certified Concentration	$\mu\text{Ci per gram}$			
Ampoule /Solution Gross		Weight, Grams		
Empty Ampoule		Weight, Grams		
Solution Net		Weight, Grams		
Total Activity in Ampoule	99.6100 μCi			
Chemical Composition of Standard Solution				
$^3\text{H}_2\text{O}$ in water				

Dilution Instructions: Dilution Solvent Used Water

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 99.6100 μCi Which Equals 2.211E+08 dpm

And after dilution the activity of this solution is 2.211E+05 dpm/ml

This standard was recertified by measurement of the activity of its daughter solution, H-5a.

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: 01/05/10

Diluted By [Signature]

Verified & Approved By [Signature]

QC Approval [Signature]

Date: 01/05/09

Date: 1/16/09

Date: 1/16/09

Eberline Services



QUALITY CONTROL PROGRAM

QCP-009

Rev.8; 11/01/03

Title: Radioactive Reference Standards Solutions & Records

Eberline Services - OAK RIDGE LABORATORY RADIOACTIVE REFERENCE STANDARD SOLUTIONS SECONDARY DILUTION (RECERTIFICATION)

QCP-009-1-A		Date	1/5/09
Solution Reference #	IPL 660-25	Solution #	H-5a
Principal Radionuclide	Half Life, Years	Half Life, Days	
^3H	1.235E+01	4.511E+03	

Radionuclide of Interest	^3H	Reference Date	4/15/1999 0:00
Parent Solution Conc.	2.21E+05 dpm/ml		

Chemical Composition of Standard Solution

$^3\text{H}_2\text{O}$ in water

Dilution Instructions:

Dilution Solvent Used

Water

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution:	65.0000 ml	Final Activity Concentration:	1.4372E+04 dpm/ml
Total Activity:	1.4372E+07 dpm		
Final Volume:	1000.00 ml		

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: 01/05/10

Recertified By: 

Date: 01/05/09

Verified & Approved By: 

Date: 1/16/09

QC Approval: 

Date: 1/16/09



**Isotope Products
Laboratories**

An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010

Fax 661•257•8303

C-3

CERTIFICATE OF CALIBRATION BETA STANDARD SOLUTION

Radionuclide:	C-14	Customer:	EBERLINE SERVICES		
Half-life:	5730 \pm 40 years	P.O. No.:	00009439		
Catalog No.:	7014	Reference Date:	1-Nov-01	12:00	PST
Source No.:	841-40	Contained Radioactivity:	72.54	μ Ci	2684 kBq

Physical Description:

A. Mass of solution:	5.10940 g in 5 mL flame-sealed ampoule
B. Chemical form:	Sodium Benzoate in 0.1M NaOH
C. Carrier content:	None
D. Density:	1.002 g/mL @ 20°C.

Radioimpurities:

None detected

Radionuclide Concentration: 14.20 μ Ci/g, 525.4 kBq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in μ Ci/g was determined using a liquid scintillation counter.

Uncertainty of Measurement:

A. Type A (random) uncertainty:	\pm 2.0 %
B. Type B (systematic) uncertainty:	\pm 2.0 %
C. Uncertainty in aliquot weighing:	\pm 0.0 %
D. Total uncertainty at the 99% confidence level:	\pm 2.8 %

Notes:

- See reverse side for leak test(s) performed on this source.
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).
- Nuclear data was taken from NCRP Report No. 58, 1985.
- This solution has a working life of 5 years.

Alan H. Khan

Quality Control

12-Nov-01

Date Signed

IPL Ref. No.: 841-40

ISO 9001 CERTIFIED

Medical Imaging Laboratory

24937 Avenue Tibbitts Valencia, California 91355

Industrial Gauging Laboratory

1800 North Keystone Street Burbank, California 91504

021

9/12/309



QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03

Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY RADIOACTIVE REFERENCE SOLUTIONS PRIMARY DILUTION REVERIFICATION MP 009

SOLUTION REFERENCE # IPL 841-40 CURRENT DATE 12/30/2008 0:00
SOLUTION # C-3

Principal Radionuclide ¹⁴Carbon Half Life, Years 5.730E+03 Half Life, Days 2.093E+06

Radionuclide ¹⁴Carbon Reference Date 11/1/2001 0:00
Certified Activity 7.254E+01 μCi
Certified Concentration $\mu\text{Ci per gram}$

Ampoule /Solution Gross Weight, Grams
Empty Ampoule Weight, Grams
Solution Net Weight, Grams
Total Activity in Ampoule 72.5400 μCi

Chemical Composition of Standard Solution
Sodium Benzoate in 0.1M NaOH

Dilution Instructions: Dilution Solvent Used 0.1M NaOH

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 72.5400 μCi Which Equals 1.610E+08 dpm at the date listed above

And after dilution the activity of this solution is 1.610E+05 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: December 30, 2009

Recertified By [Signature]

Date: 12/30/2008 0:00

Verified & Approved By [Signature]

Date: 1/16/09

QC Approval [Signature]

Date: 1/16/09



QUALITY CONTROL PROGRAM
QCP-009

Rev.8; 1/10/03

Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION REVERIFICATION

Solution Reference #		MP-009-1-A IPL 841-40	Date	12/30/2008 0:00
Solution #			C-3a	
Principal Radionuclide	Half Life, Years	Half Life, Days		
¹⁴ Carbon	5.730E+03	2.093E+06		
Radionuclide of Interest	¹⁴ Carbon	Reference Date	11/1/2001 0:00	
Parent Solution Conc.	1.61E+05 dpm/ml			

Chemical Composition of Standard Solution
Sodium Benzoate in 0.1M NaOH

Dilution Instructions: Dilution Solvent Used 0.1 M NaOH


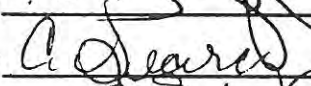
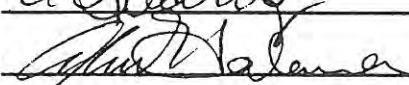
SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution:	20.0000 ml	Final Activity Concentration:	3.2208E+03 dpm/ml
Total Activity:	3.2208E+06 dpm		
Final Volume:	1000.00 ml		

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: December 30, 2009

Recertified By 
Verified & Approved By 
QC Approval 

Date: 12/30/2008 0:00

Date: 11/16/09

Date: 11/16/09

SECTION VI
QUALITY CONTROL SAMPLE RESULTS SUMMARY

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
09-111114	H0003	1	pCi	g	Energy Solutions, LLC

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
H-3	0.51	97.04%	11.43%	100.00%	3.60%	3.55E+02	1.28E+01	3.45E+02	3.94E+01	H-5a	7.90E+03	3.60E+00	9.99E-02

Matrix Spike

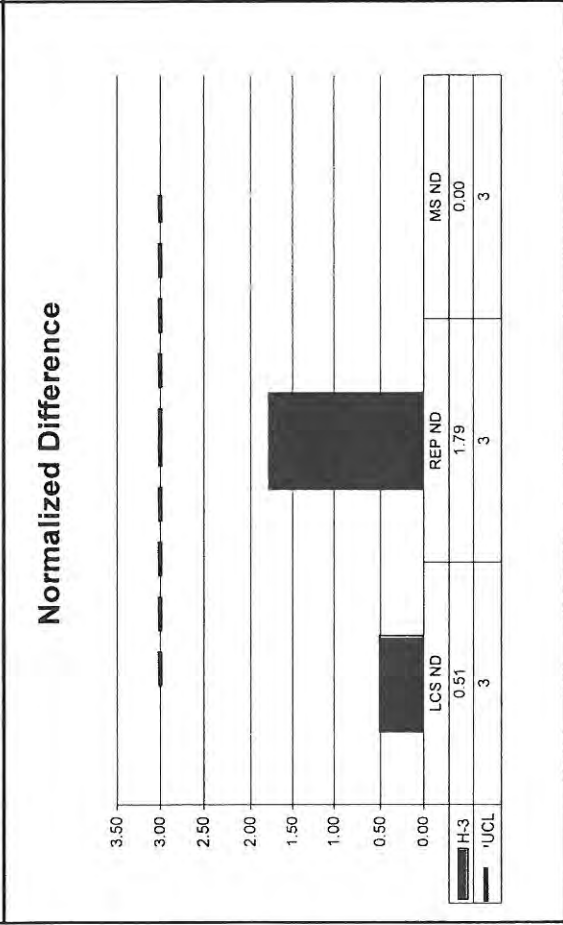
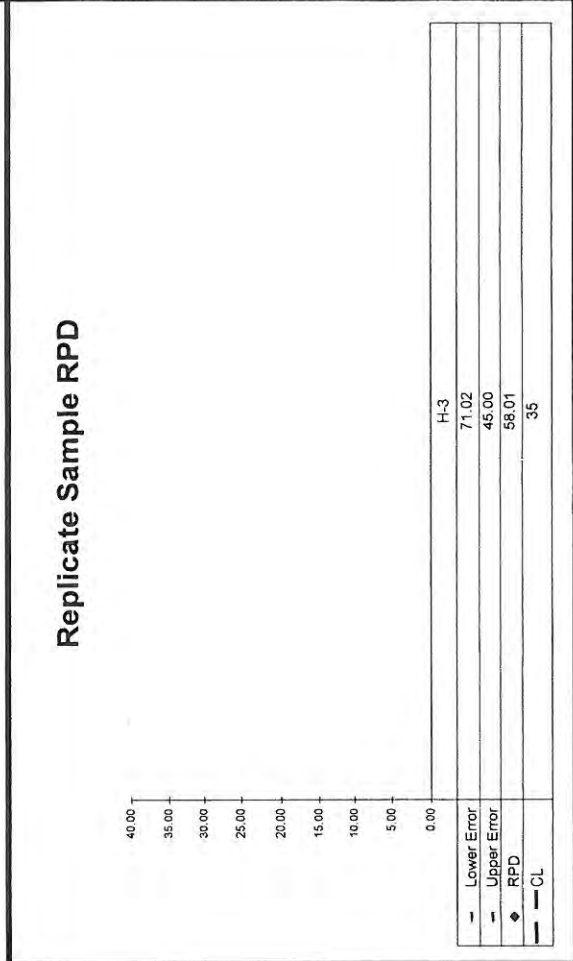
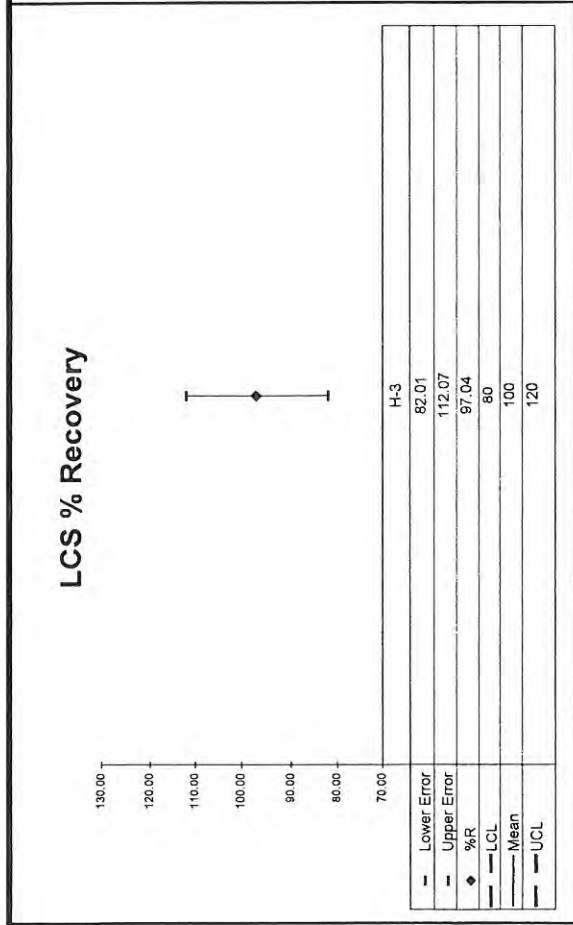
Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

Replicate Sample

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU	LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
H-3	1.79	58.01	9.51E+00	3.56E+00	5.24E+00	3.05E+00	0.97	OK	OK			INV	OK

QC Summary

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
09-11114	H0003	1	pCi	g	Energy Solutions, LLC



No Matrix Spike

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
09-11114	C0014	1	pCi	g	Energy Solutions, LLC

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
C-14	4.31	105.36%	1.53%	100.00%	2.80%	3.65E+02	1.02E+01	3.84E+02	5.88E+00	C-3a	3.09E+03	2.80E+00	2.62E-01

Matrix Spike

Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

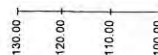
Replicate Sample

Analyte	Normalized Difference	RPD	Original Result	Expected MS Result	Replicate Result	Replicate CSU	LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
C-14	0.54	62.22	-6.38E-01	1.53E+00	-1.22E+00	1.44E+00	1.05	OK	INV			INV	OK

QC Summary

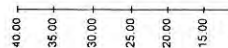
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
09-11114	C0014	1	pCi	g	Energy Solutions, LLC

LCS % Recovery



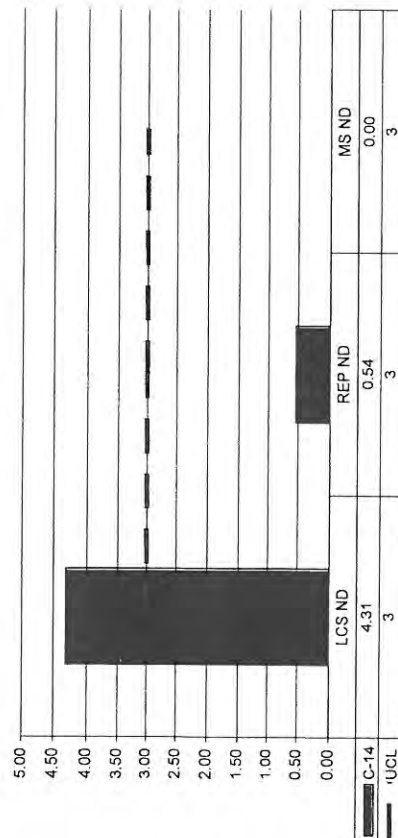
Lower Error	101.03
Upper Error	105.69
%R	105.36
LCL	80
Mean	100
UCL	120

Replicate Sample RPD



Lower Error	12.29
Upper Error	112.14
RPD	62.22
CL	35

Normalized Difference



LCS ND	4.31
REP ND	0.54
MS ND	0.00

No Matrix Spike


SECTION VII
LABORATORY TECHNICIAN'S NOTES

H-3 NOTES

 EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	09-11114
		Analysis Code	H0003
		Run Number	1

#	Date	Dept	User	Notes
1	11/25/09 11:42	PREP	JPACHELLA	Samples were aliquoted. Spikes and blanks were prepared. Samples were processed through Harvey Oxidizer. Samples were submitted to count room.

11-25-09 JPachella

 EBERLINE SERVICES Reagents Used in an Analysis		Internal Work Order		
		09-11114		
		Analysis Code		Run
		H0003		1
Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
008490P	Ultima Gold XR	Reagent Grade	JPACHELLA	11/25/2009

Prüfung 3100 (A)

81


Date	Sample #	Count	Count	Load Time	Gr. Time	Analysis	Team
11/23/09	0911087A(1-38,9,12,13)	2	EnergySol	1614	4 hrs	H ³	ICB
11/24/09	0911074A(1-5,16)	19	BJC	1510	6 hrs	BT Act.	ICB
11/24/09	0911073A(1-4,16)	16	BJC	1515	6 hrs	TC 99	ICB
11/25/09	0911114A(1-15,16)	1	EnergySol	1336	8 hrs	H ³	ICB

C-14 NOTES

 EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	09-11114
		Analysis Code	C0014
		Run Number	1

#	Date	Dept	User	Notes
1	11/25/09 11:42	PREP	JPACHELLA	Samples were aliquoted. Spikes and blanks were prepared. Samples were processed through Harvey Oxidizer. Samples were submitted to count room.

11-25-09 JPachella

 EBERLINE SERVICES Reagents Used in an Analysis		Internal Work Order		
		09-11114		
		Analysis Code		Run
		C0014		1
Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
008424P	Harvey carbon14 cocktail	Reagent Grade	JPACHELLA	11/25/2009

Date	Sample #	30000	Current	Lead Time	Est. Time	Analyzer	27
11/17/09	0911062A (1-4, 6, B)	17	BSC	1538	6 hrs	TC99	ICB
11/18/09	0911062A (1-3, 5, B, R)	7	BSC	0929	3 hrs	C14	ICB
11/18/09	0911028A (1-6)	24	Unitech	1042	6 hrs	Pu241	ICB
11/18/09	0911063A (1-3, 5, B, R)	7	BSC	1249	3 hrs	C14	ICB
11/18/09	0911062A (1-3, 5, B)	1	BSC	1705	10 hrs	H3	ICB
11/18/09	0911063A (1-3, 5, B)	3	BSC	1710	10 hrs	H3	ICB
11/19/09	0911040A (1-4, A, B)	11	BSC	1439	1 1/2 hrs	Ni63	ICB
11/19/09	0911058A (1-4, B)	13	ES	1552	5 hrs	TC99	ICB
11/19/09	0911073A (1-3, 5, B, R)	7	BSC	1019	3 hrs	C14	ICB
11/23/09	0911088A (1-4, 12, 17, B)	1	Energy Sol	1102	3 1/2 hrs	H3	ICB
11/23/09	0911089A (1-5, B)	3	Energy Sol	1107	3 hrs	H3	ICB
11/23/09	0911090A (1-5, B)	4	Energy Sol	1119	3 hrs	H3	ICB
11/24/09	0911071A (1-4, B)	13	ES	1504	5 hrs	TC99	ICB
11/24/09	0911074A (1-4, B)	14	BSC	1507	7 hrs	TC99	ICB
11/25/09	0911114A (1-15, B, R)	6	Energy Sol	1327	8 1/2 hrs	C14	ICB

SECTION VIII
ANALYTICAL DATA (TRITIUM)

Work Order	09-11114
Analysis Code	H0003
Run	1
Date Received	11/25/2009
Lab Deadline	11/30/2009
Client	Energy Solutions, LLC
Project	ENV
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	LANL ER-210 Modified
Instrument Type	Beta LSC
Radiometric Tracer	
Radiometric Sol#	
Tracer Act (dpm/g)	
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/25/09 00:00	1.0000E+00
02	MBL	BLANK		11/25/09 00:00	1.0000E+00
03	DUP	ES-SU009-S-15	44	11/24/09 07:00	1.0675E+00
04	DO	ES-SU009-S-15	44	11/24/09 07:00	1.0253E+00
05	TRG	ES-SU009-S-18	49	11/24/09 07:10	1.1768E+00
06	TRG	ES-SU009-S-21	36	11/24/09 07:15	1.0972E+00
07	TRG	ES-B-S-1	43	11/24/09 07:20	1.1166E+00
08	TRG	ES-B-S-2	56	11/24/09 07:25	1.0587E+00
09	TRG	ES-B-S-3	49	11/24/09 07:30	1.0358E+00
10	TRG	ES-B-S-4	45	11/24/09 07:40	1.1454E+00
11	TRG	ES-B-S-5	41	11/24/09 07:45	1.0930E+00
12	TRG	ES-B-S-6	40	11/24/09 08:00	1.0774E+00
13	TRG	ES-B-S-7	31	11/24/09 08:10	1.0763E+00
14	TRG	ES-B-S-8	53	11/24/09 08:15	1.0620E+00
15	TRG	ES-B-S-9	42	11/24/09 08:30	1.0713E+00

[illegible]

[illegible]

Client		Energy Solutions, LLC	
Eberline Services Work Order		09-11114	
Analysis Code		H0003	
Run	1		

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	H-3	LCS	LCS	pCi/g	3.45E+02	9.55E+00	5.19E+00	3.55E+02	97.04	OK		OK	
02	H-3	MBL	BLANK	pCi/g	3.55E+00	2.98E+00	4.95E+00					OK	OK
03	H-3	DUP	ES-SU009-S-15	pCi/g	5.24E+00	2.99E+00	4.86E+00				INV	OK	
04	H-3	DO	ES-SU009-S-15	pCi/g	9.51E+00	3.40E+00	5.30E+00					OK	
05	H-3	TRG	ES-SU009-S-18	pCi/g	1.29E+01	3.06E+00	4.50E+00					OK	
06	H-3	TRG	ES-SU009-S-21	pCi/g	1.51E+01	3.24E+00	4.68E+00					OK	
07	H-3	TRG	ES-B-S-1	pCi/g	1.24E+01	3.30E+00	4.94E+00					OK	
08	H-3	TRG	ES-B-S-2	pCi/g	1.12E+02	5.92E+00	5.12E+00					OK	
09	H-3	TRG	ES-B-S-3	pCi/g	2.24E+01	3.78E+00	5.20E+00					OK	
10	H-3	TRG	ES-B-S-4	pCi/g	4.99E+00	2.85E+00	4.63E+00					OK	
11	H-3	TRG	ES-B-S-5	pCi/g	1.24E+01	3.31E+00	4.95E+00					OK	
12	H-3	TRG	ES-B-S-6	pCi/g	1.10E+01	3.34E+00	5.10E+00					OK	
13	H-3	TRG	ES-B-S-7	pCi/g	1.07E+01	3.27E+00	4.99E+00					OK	
14	H-3	TRG	ES-B-S-8	pCi/g	7.35E+00	3.22E+00	5.12E+00					OK	
15	H-3	TRG	ES-B-S-9	pCi/g	1.29E+01	3.42E+00	5.12E+00					OK	

[illegible]

	Client	Energy Solutions, LLC
	Eberline Services Work Order	09-11114
	Analysis Code	H0003
Run	1	

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Half-life (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	H-3	LCS	11/25/09 13:37	4485.27	3100A	1	30	5850	10	0.241709437
02	H-3	MBL	11/25/09 14:08	4485.27	3100A	2	30	360	10	0.253509424
03	H-3	DUP	11/25/09 14:39	4485.27	3100A	3	30	390	10	0.241837824
04	H-3	DO	11/25/09 15:10	4485.27	3100A	4	30	450	10	0.230948222
05	H-3	TRG	11/25/09 15:41	4485.27	3100A	5	30	540	10	0.237052468
06	H-3	TRG	11/25/09 16:11	4485.27	3100A	6	30	570	10	0.244335547
07	H-3	TRG	11/25/09 16:42	4485.27	3100A	7	30	510	10	0.227516771
08	H-3	TRG	11/25/09 17:13	4485.27	3100A	8	30	2130	10	0.23159016
09	H-3	TRG	11/25/09 17:44	4485.27	3100A	9	30	660	10	0.232967408
10	H-3	TRG	11/25/09 18:14	4485.27	3100A	10	30	390	10	0.236503903
11	H-3	TRG	11/25/09 18:45	4485.27	3100A	11	30	510	10	0.231753562
12	H-3	TRG	11/25/09 19:16	4485.27	3100A	12	30	480	10	0.228263754
13	H-3	TRG	11/25/09 19:47	4485.27	3100A	13	30	480	10	0.233749406
14	H-3	TRG	11/25/09 20:17	4485.27	3100A	14	30	420	10	0.230913207
15	H-3	TRG	11/25/09 20:48	4485.27	3100A	15	30	510	10	0.228590558

[illegible]

04

Page 1 of 1
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H-3 Known for solids = LCS Known / Net Equiv. Aliq.

Aliquot Worksheet

[illegible]

047

Technician:

Paella

Date:

11,2509

Protocol# 1 - h3-cpm-1.1sa

User: Default

Assay Definition-

Assay Description:
H3

Assay Type: CPM

Report Name: Report1

Output Data Path: C:\Packard\Tricarb\Results\Default\h3-cpm-1\20091125_1337

Raw Results Path: C:\Packard\Tricarb\Results\Default\h3-cpm-1\20091125_1337\20091125_1337.results

Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\h3-cpm-1\20091125_1337\0911114 h3a.csv

Assay File Name: C:\Packard\TriCarb\Assays\h3-cpm-1.1sa

Count Conditions-

Nuclide: 3H

Quench Indicator: tSIE

External Std Terminator (sec): 0.5 2s%

Pre-Count Delay (min): 0.00

Quench Set: n/a

Count Time (min): 30.00

Count Mode: Normal

Assay Count Cycles: 1

Repeat Sample Count: 1

#Vials/Sample: 1

Calculate % Reference: Off

Background Subtract: Off

Low CPM Threshold: Off

2 Sigma % Terminator: Off

Regions	LL	UL
A	0.0	18.6
B	2.0	18.6
C	0.0	0.0

Count Corrections-

Static Controller: On

Luminescence Correction: Off

Colored Samples: n/a

Heterogeneity Monitor: n/a

Coincidence Time (nsec): 18

Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

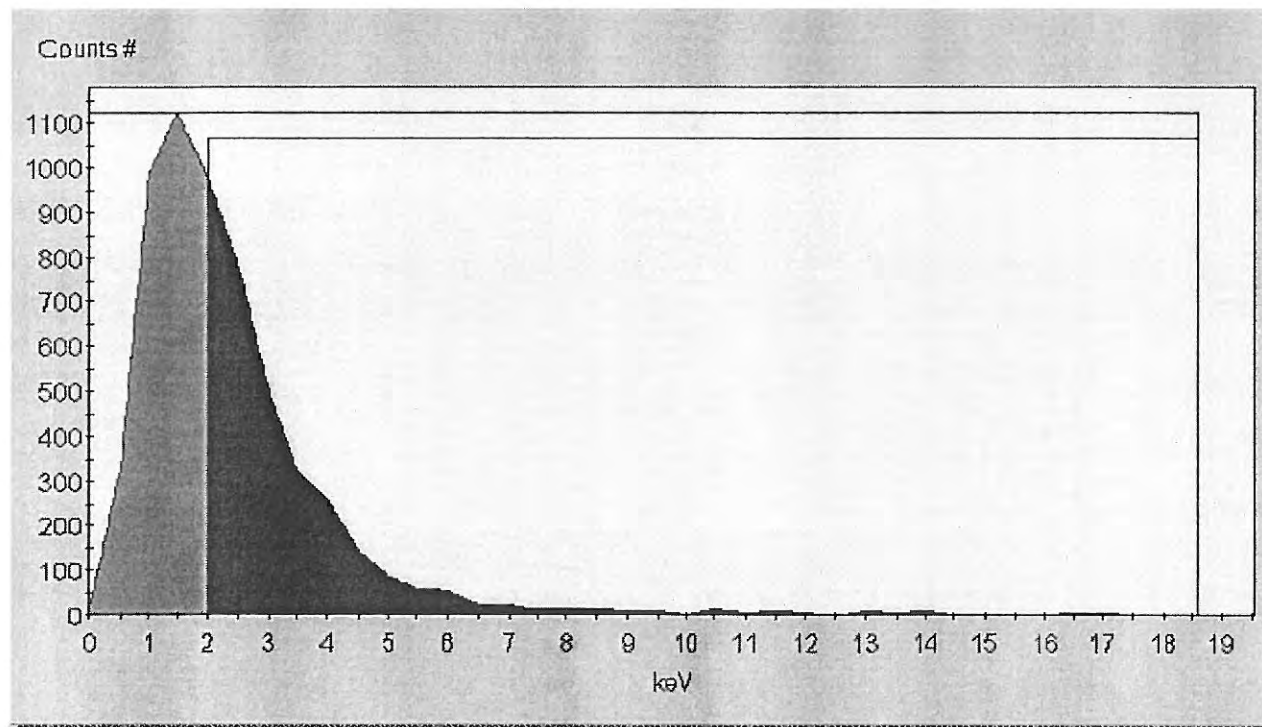
Cycle 1 Results

Time	DATE	SMPL_ID	P#	PID	S#	CPMA	CPMB	CPMC	tSIE	Count
30.00	11/25/2009	09-11114-1-H3-01S	1	1	1	195	113	0	242.98	

SpectraView Block Data

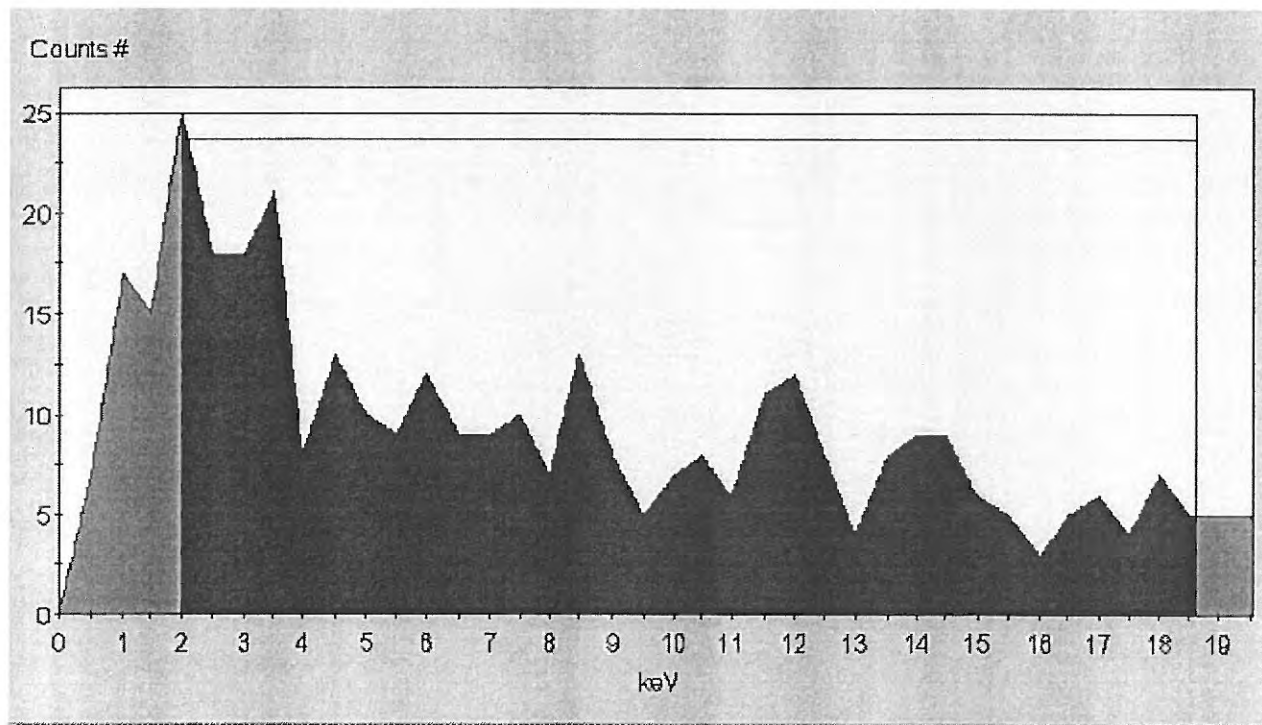
AG
11/27/09

(A)



09-11114-1-H3-02S 1 1 2 12 10 0 253.09
30.00 11/25/2009 2:08:51 PM

SpectraView Block Data

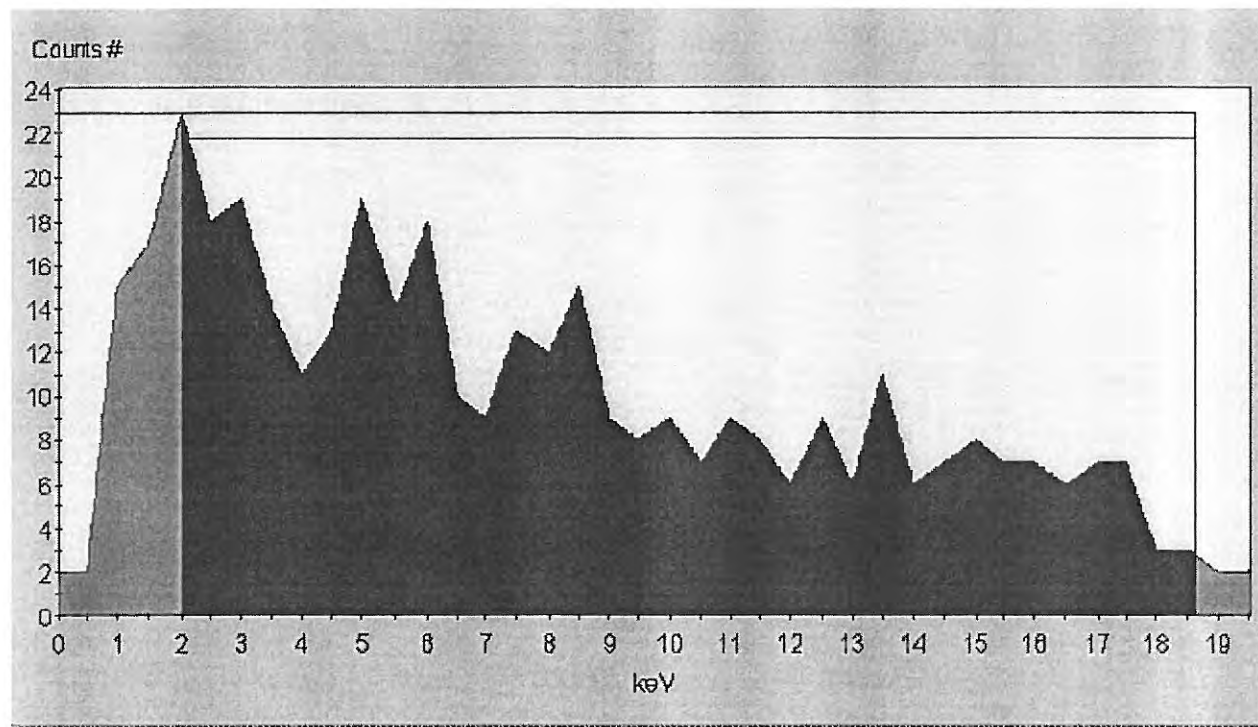


Protocol# 1 - h3-cpm-1.1sa

User: Default

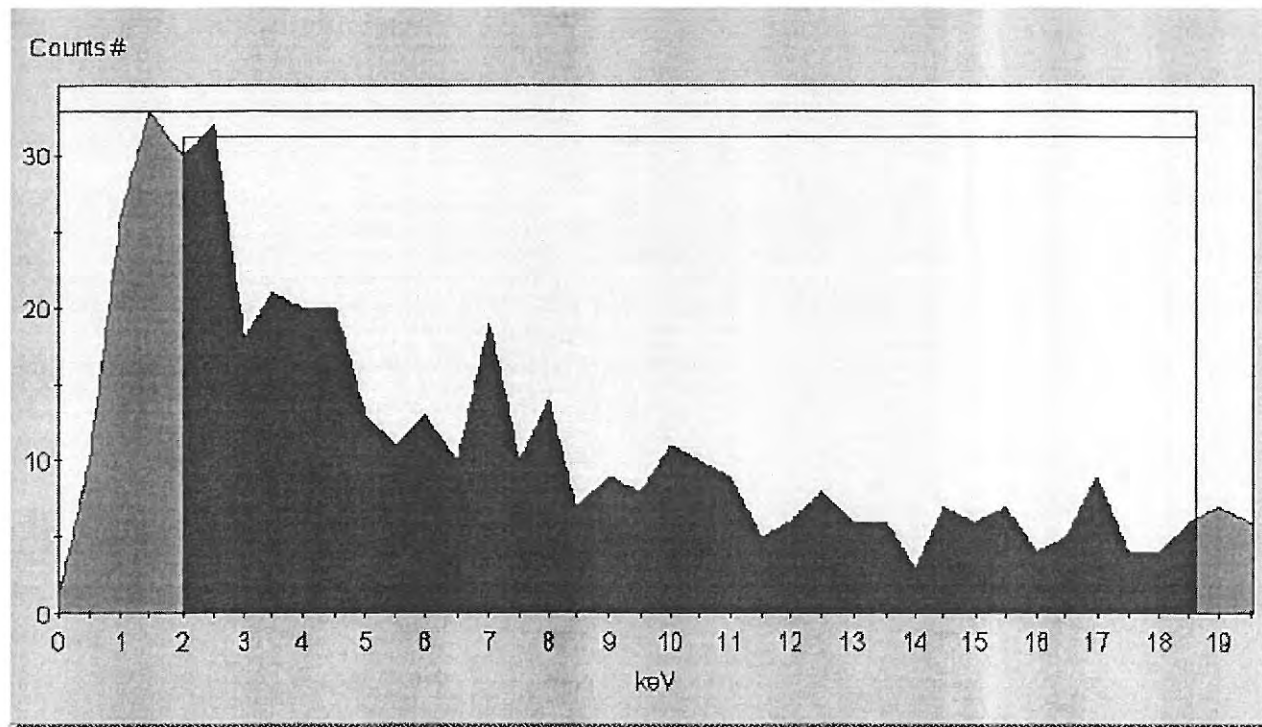
09-11114-1-H3-03S 1 1 3 13 12 0 243.09
30.00 11/25/2009 2:39:36 PM

SpectraView Block Data



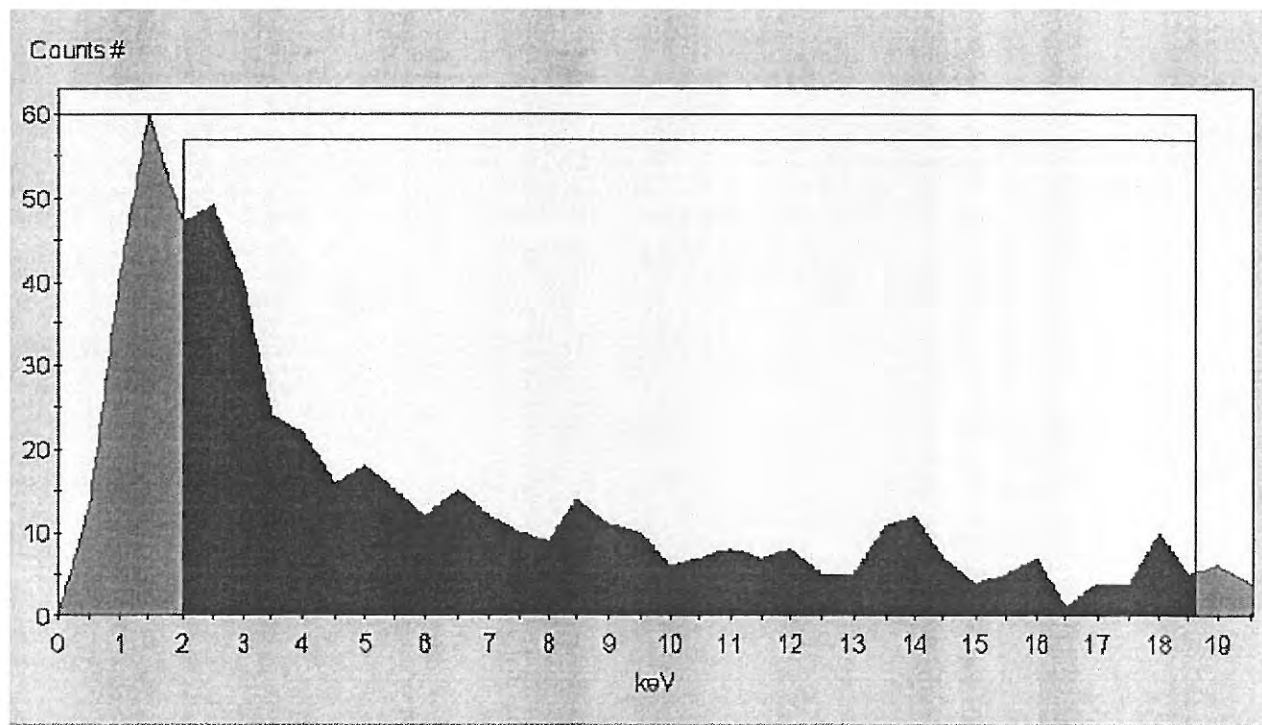
09-11114-1-H3-04S 1 1 4 15 12 0 233.76
30.00 11/25/2009 3:10:21 PM

SpectraView Block Data



09-11114-1-H3-05S 1 1 5 18 15 0 238.99
30.00 11/25/2009 3:41:07 PM

SpectraView Block Data

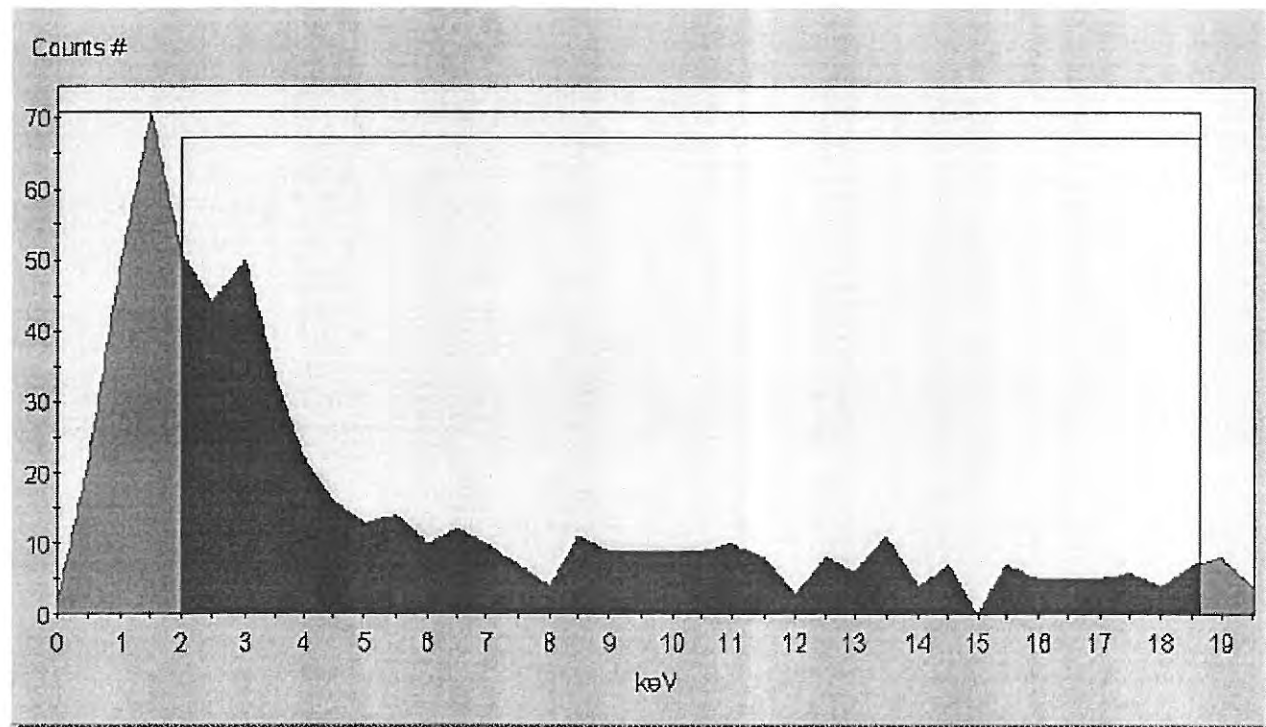


Protocol# 1 - h3-cpm-1.lsa

User: Default

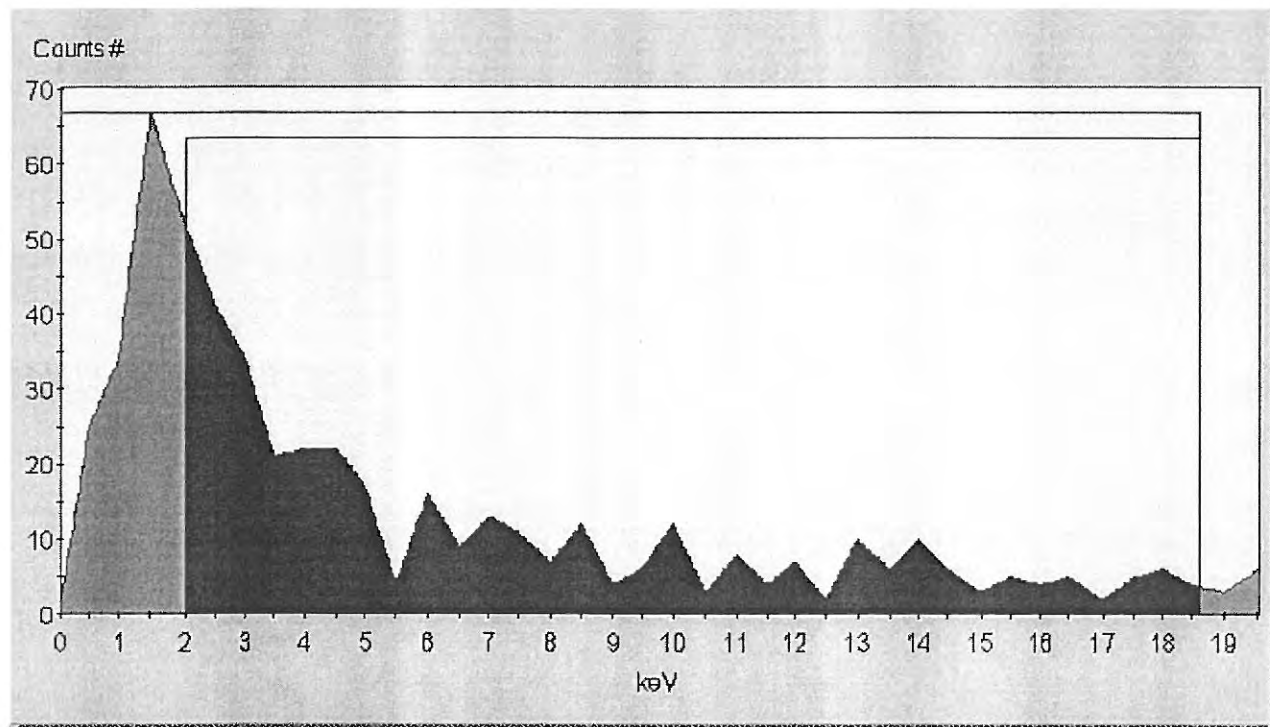
09-11114-1-H3-06S 1 1 6 19 14 0 245.23
30.00 11/25/2009 4:11:51 PM

SpectraView Block Data



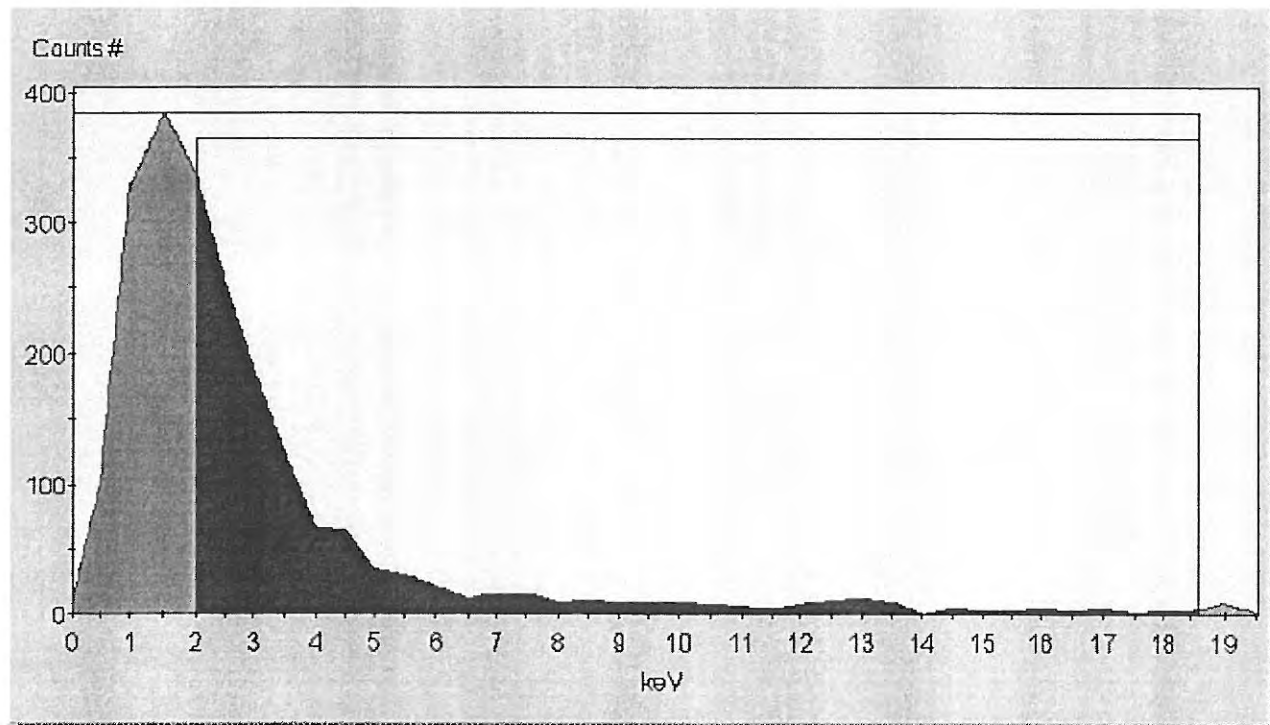
09-11114-1-H3-07S 1 1 7 17 13 0 230.82
30.00 11/25/2009 4:42:35 PM

SpectraView Block Data



09-11114-1-H3-08S 1 1 8 71 44 0 234.31
30.00 11/25/2009 5:13:20 PM

SpectraView Block Data

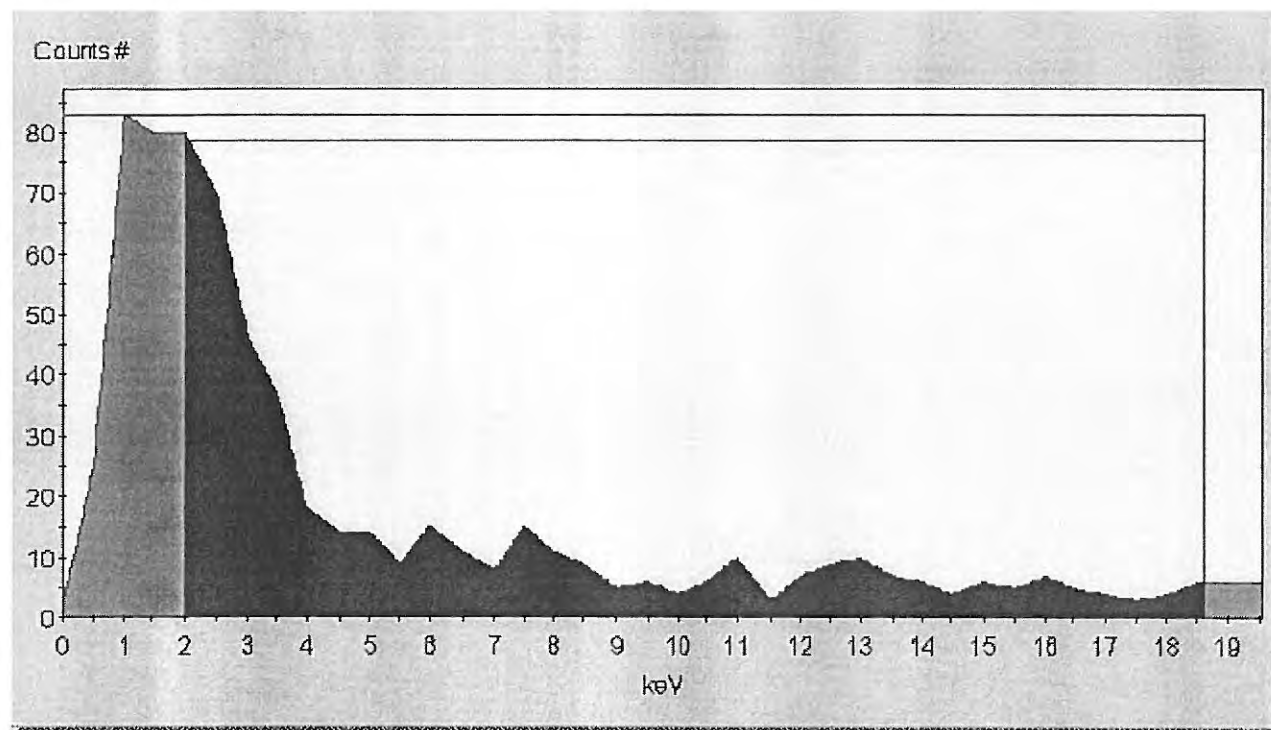


Protocol# 1 - h3-cpm-1.lsa

User: Default

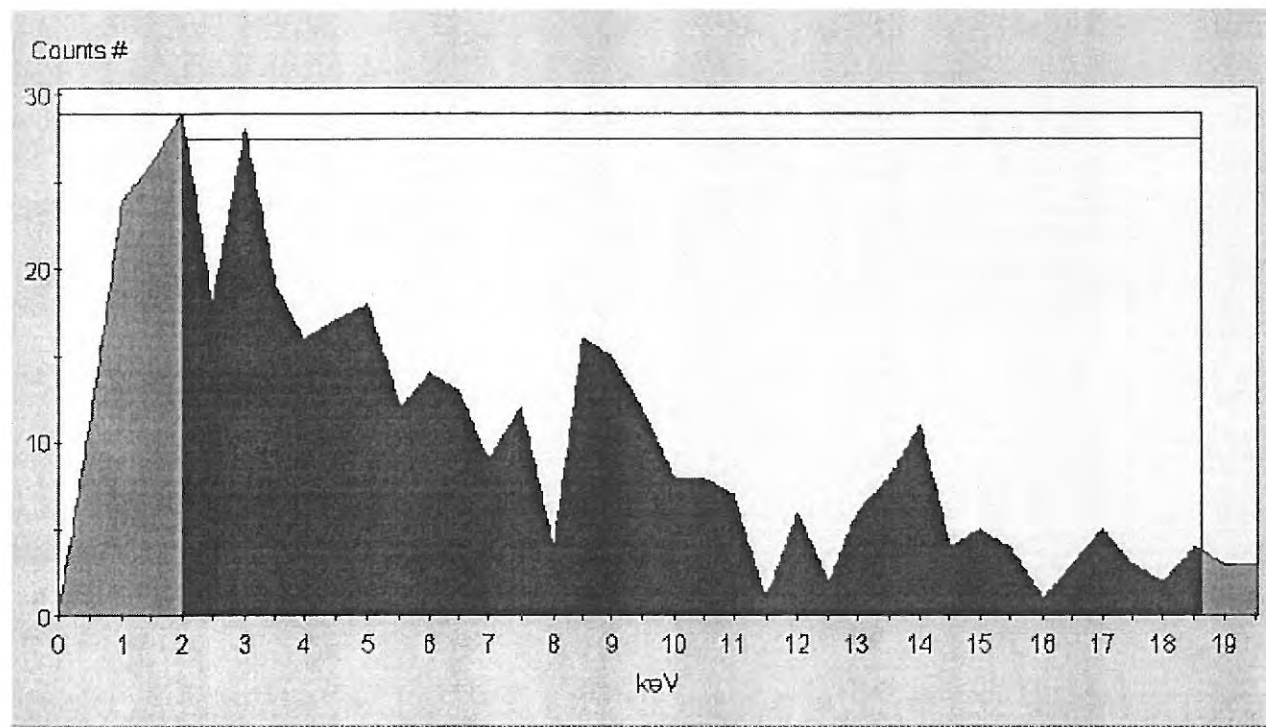
09-11114-1-H3-09S 1 1 9 22 16 0 235.49
30.00 11/25/2009 5:44:06 PM

SpectraView Block Data



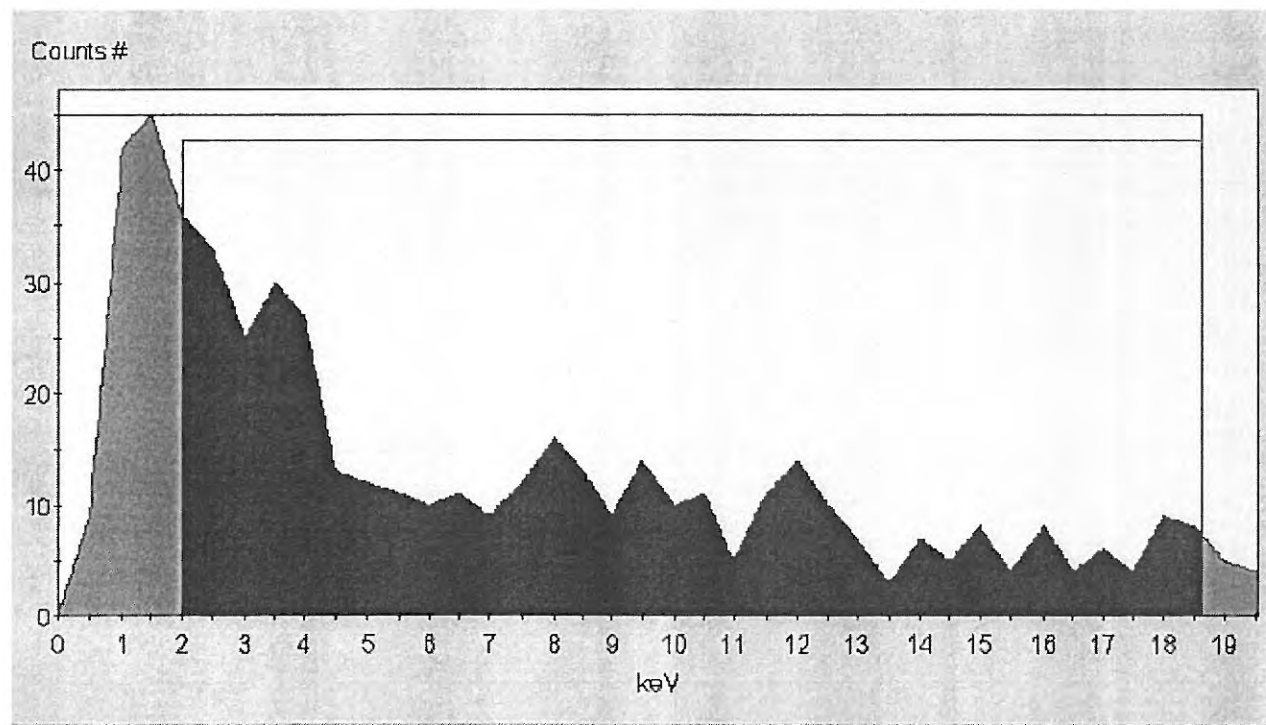
09-11114-1-H3-10S 1 1 10 13 11 0 238.52
30.00 11/25/2009 6:14:51 PM

SpectraView Block Data



09-11114-1-H3-11S 1 1 11 17 14 0 234.45
30.00 11/25/2009 6:45:35 PM

SpectraView Block Data

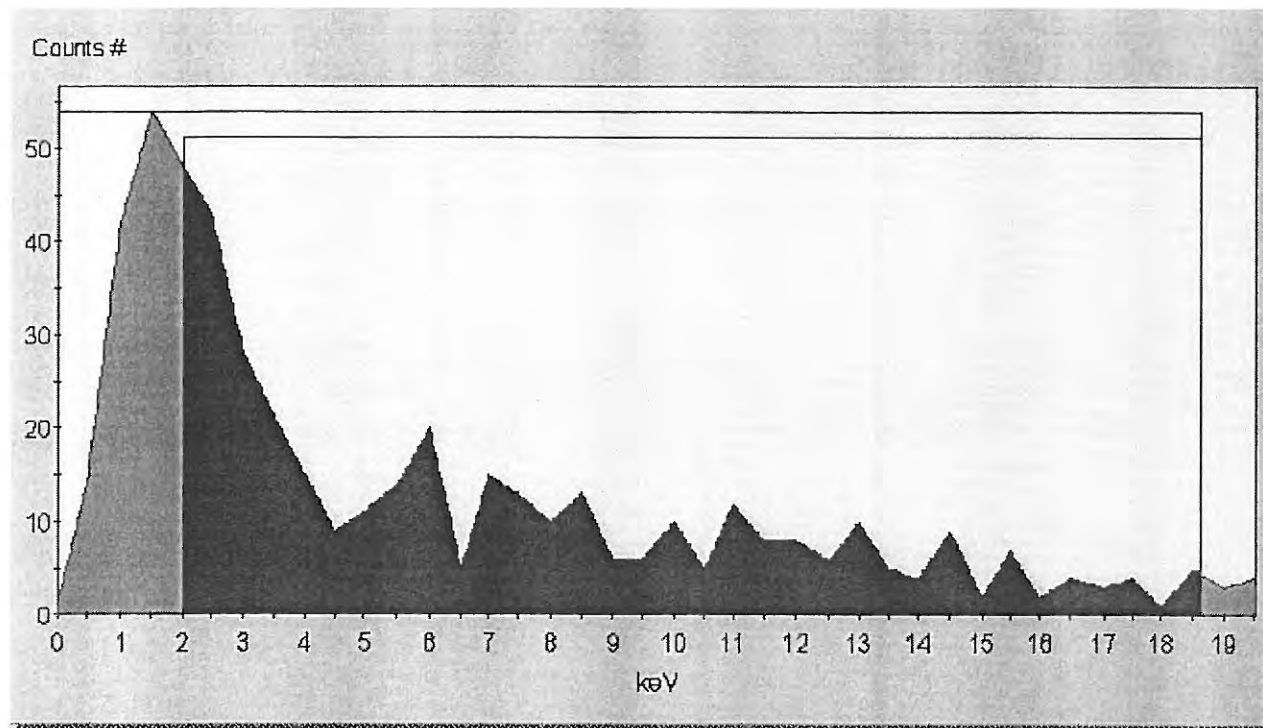


Protocol# 1 - h3-cpm-1.1sa

User: Default

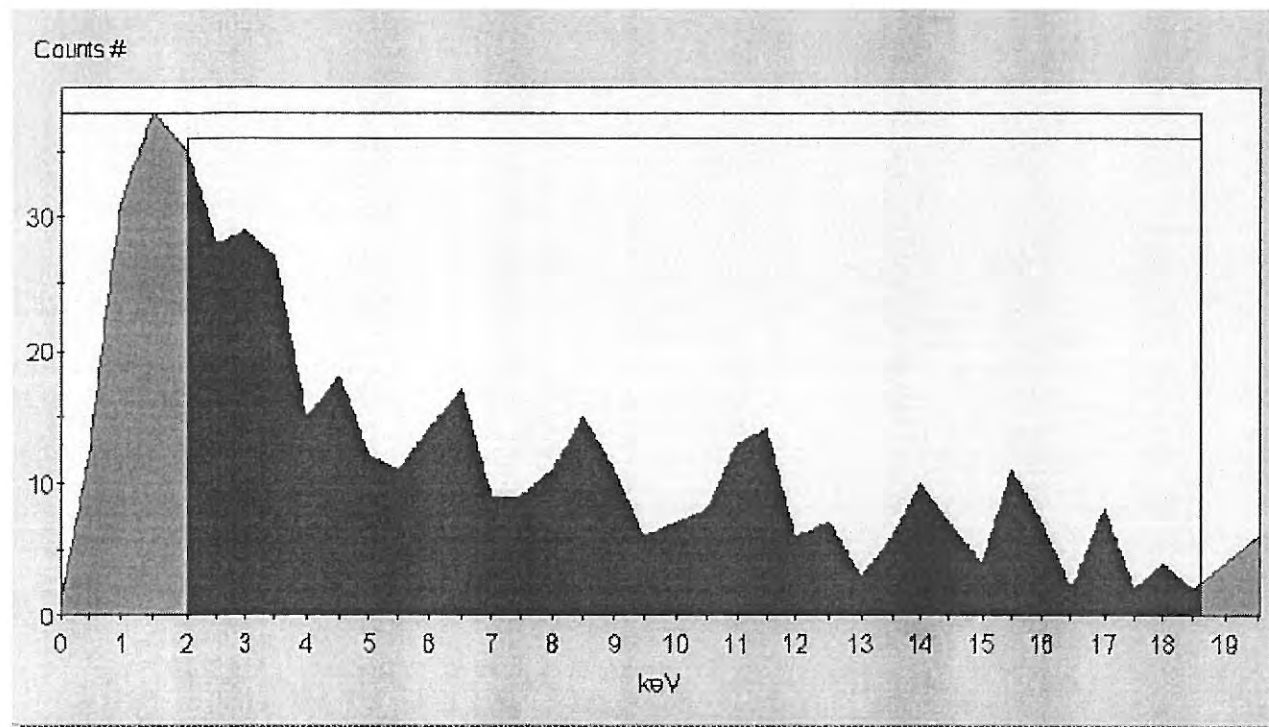
09-11114-1-H3-12S 1 1 12 16 13 0 231.46
30.00 11/25/2009 7:16:19 PM

SpectraView Block Data



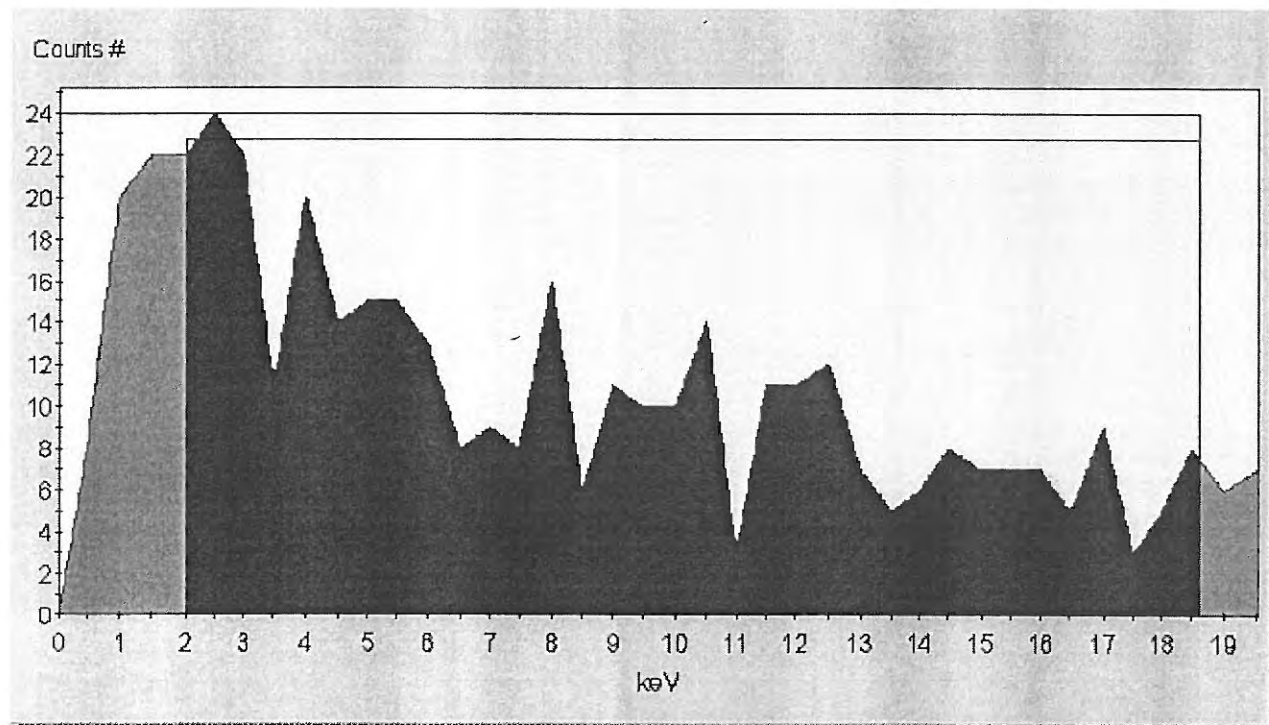
09-11114-1-H3-13S 1 32 13 16 13 0 236.16
30.00 11/25/2009 7:47:08 PM

SpectraView Block Data



09-11114-1-H3-14S 1 32 14 14 12 0 233.73
30.00 11/25/2009 8:17:52 PM

SpectraView Block Data

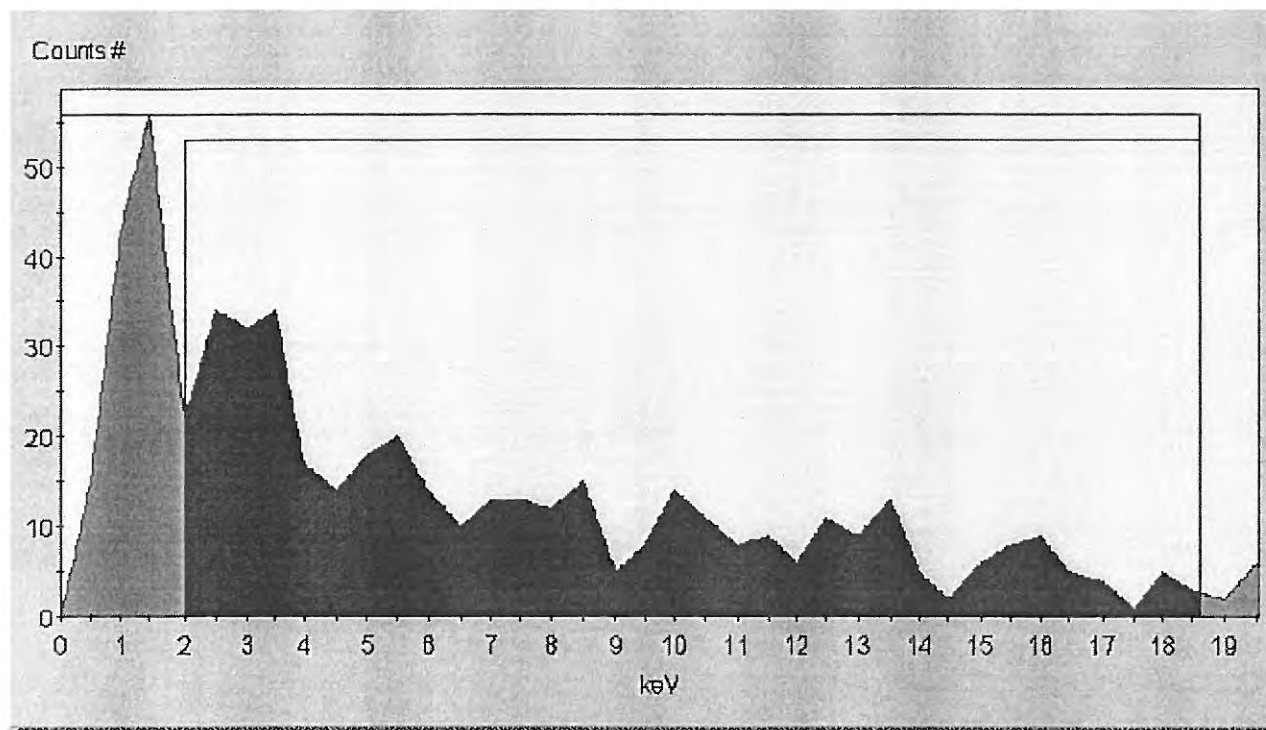


Protocol# 1 - h3-cpm-1.lsa

User: Default

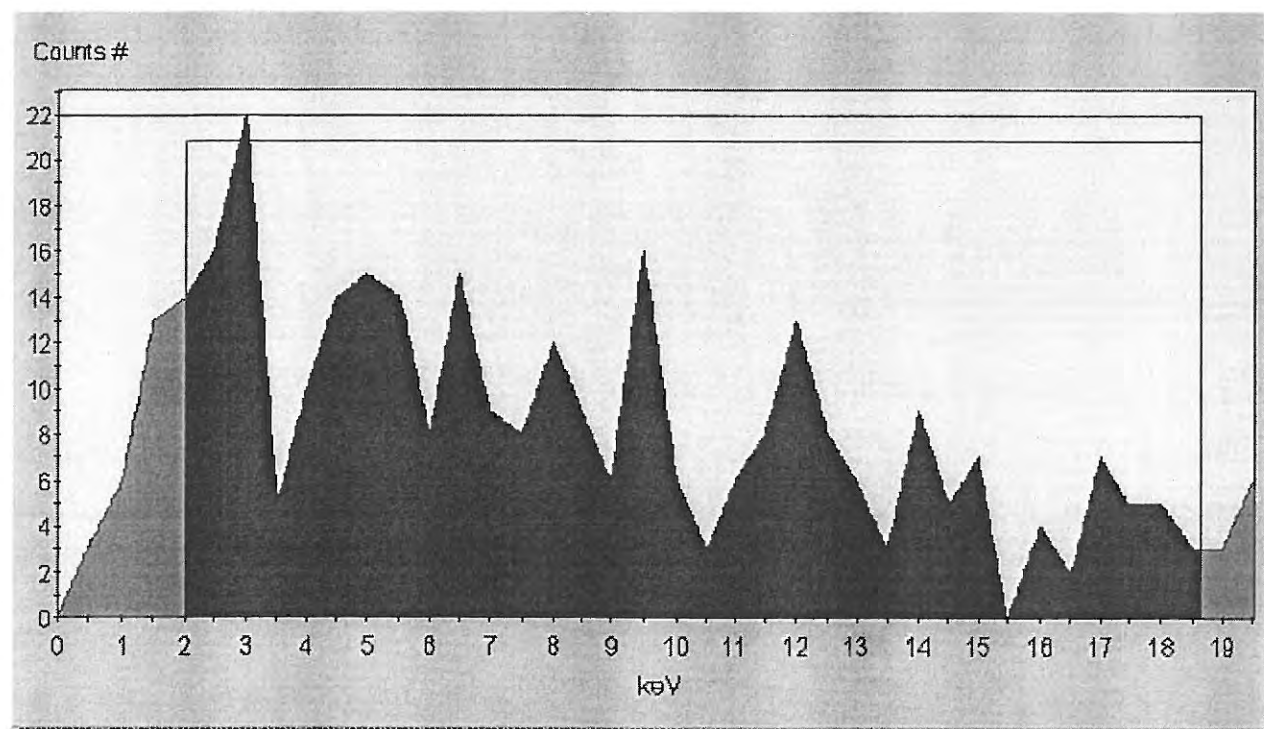
09-11114-1-H3-15S 1 32 15 17 14 0 231.74
30.00 11/25/2009 8:48:37 PM

SpectraView Block Data



Sample #16 1 32 16 10 10 0 274.00
30.00 11/25/2009 9:19:21 PM

SpectraView Block Data



SNC Protocol

AG
11/25/09

(A)

Calibration Information

Software Version IC: 2.11

Software Version EC: 2.02

Instrument Model: Tri-Carb 3100TR

Instrument Serial Number: 426825

3H Chi Square: 9.44 Date Processed: 11/25/2009 8:02:05 AM

14C Chi Square: 10.63 Date Processed: 11/25/2009 8:02:05 AM

3H E²/B (1-18.6 keV): 289.95 Date Processed: 11/25/2009 8:02:05 AM14C E²/B (4-156 keV): 536.77 Date Processed: 11/25/2009 8:02:05 AM

3H Efficiency (0-18.6 keV): 63.89 Date Processed: 11/25/2009 8:02:05 AM

14C Efficiency (0-156 keV): 96.22 Date Processed: 11/25/2009 8:02:05 AM

IPA Background Date Processed: 11/25/2009 8:02:05 AM

3H Background CPM (0-18.6 keV): 13.98 Date Processed: 11/25/2009 8:02:05 AM

14C Background CPM (0-156 keV): 20.92 Date Processed: 11/25/2009 8:02:05 AM

3H Calibration DPM: 183600

3H Reference Date: 2/27/2007

14C Calibration DPM: 136900

SECTION IX
ANALYTICAL DATA (CARBON-14)

09-111114
C0014
Run 1

Printed: 11/25/2009 11:39 AM
Page 1 of 3

Work Order	09-111114
Analysis Code	C0014
Run	1
Date Received	11/25/2009
Lab Deadline	11/30/2009
Client	Energy Solutions, LLC
Project	ENV
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EPA 520.0 Modified
Instrument Type	Beta LSC
Radiometric Tracer	
Radiometric Sol#	
Tracer Act (dpm/g)	
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/25/09 00:00	1.0000E+00
02	MBL	BLANK		11/25/09 00:00	1.0000E+00
03	DUP	ES-SU009-S-15	44	11/24/09 07:00	1.0675E+00
04	DO	ES-SU009-S-15	44	11/24/09 07:00	1.0253E+00
05	TRG	ES-SU009-S-18	49	11/24/09 07:10	1.1768E+00
06	TRG	ES-SU009-S-21	36	11/24/09 07:15	1.0972E+00
07	TRG	ES-B-S-1	43	11/24/09 07:20	1.1166E+00
08	TRG	ES-B-S-2	56	11/24/09 07:25	1.0587E+00
09	TRG	ES-B-S-3	49	11/24/09 07:30	1.0358E+00
10	TRG	ES-B-S-4	45	11/24/09 07:40	1.1454E+00
11	TRG	ES-B-S-5	41	11/24/09 07:45	1.0930E+00
12	TRG	ES-B-S-6	40	11/24/09 08:00	1.0774E+00
13	TRG	ES-B-S-7	31	11/24/09 08:10	1.0763E+00
14	TRG	ES-B-S-8	53	11/24/09 08:15	1.0620E+00
15	TRG	ES-B-S-9	42	11/24/09 08:30	1.0713E+00

[illegible]

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* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only.

** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

[illegible]

	Client	Energy Solutions, LLC	
	Eberline Services Work Order	09-11114	
	Analysis Code	C0014	
Run	1		

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	C-14	LCS	LCS	pCi/g	3.84E+02	5.85E+00	2.69E+00	3.65E+02	105.36	OK		OK	
02	C-14	MBL	BLANK	pCi/g	6.43E-01	1.58E+00	2.68E+00					OK	OK
03	C-14	DUP	ES-SU009-S-15	pCi/g	-1.22E+00	1.44E+00	2.53E+00				INV	OK	
04	C-14	DO	ES-SU009-S-15	pCi/g	-6.38E-01	1.53E+00	2.66E+00					OK	
05	C-14	TRG	ES-SU009-S-18	pCi/g	-1.52E+00	1.27E+00	2.26E+00					OK	
06	C-14	TRG	ES-SU009-S-21	pCi/g	4.11E+00	1.53E+00	2.45E+00					OK	
07	C-14	TRG	ES-B-S-1	pCi/g	2.40E+01	1.96E+00	2.45E+00					OK	
08	C-14	TRG	ES-B-S-2	pCi/g	-1.21E+00	1.43E+00	2.52E+00					OK	
09	C-14	TRG	ES-B-S-3	pCi/g	-2.48E+00	1.44E+00	2.58E+00					OK	
10	C-14	TRG	ES-B-S-4	pCi/g	-2.27E+00	1.31E+00	2.36E+00					OK	
11	C-14	TRG	ES-B-S-5	pCi/g	-2.34E+00	1.36E+00	2.44E+00					OK	
12	C-14	TRG	ES-B-S-6	pCi/g	1.77E+00	1.48E+00	2.47E+00					OK	
13	C-14	TRG	ES-B-S-7	pCi/g	-5.99E-01	1.44E+00	2.50E+00					OK	
14	C-14	TRG	ES-B-S-8	pCi/g	-3.04E+00	1.40E+00	2.54E+00					OK	
15	C-14	TRG	ES-B-S-9	pCi/g	-1.21E+00	1.44E+00	2.52E+00					OK	

[illegible]

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	11/25/09 00:00	1.0000				0.00		
02	MBL	BLANK	11/25/09 00:00	1.0000				0.00		
03	DUP	ES-SU009-S-15	11/24/09 07:00	1.0675				0.00		
04	DO	ES-SU009-S-15	11/24/09 07:00	1.0253				0.00		
05	TRG	ES-SU009-S-18	11/24/09 07:10	1.1768				0.00		
06	TRG	ES-SU009-S-21	11/24/09 07:15	1.0972				0.00		
07	TRG	ES-B-S-1	11/24/09 07:20	1.1166				0.00		
08	TRG	ES-B-S-2	11/24/09 07:25	1.0587				0.00		
09	TRG	ES-B-S-3	11/24/09 07:30	1.0358				0.00		
10	TRG	ES-B-S-4	11/24/09 07:40	1.1454				0.00		
11	TRG	ES-B-S-5	11/24/09 07:45	1.0930				0.00		
12	TRG	ES-B-S-6	11/24/09 08:00	1.0774				0.00		
13	TRG	ES-B-S-7	11/24/09 08:10	1.0763				0.00		
14	TRG	ES-B-S-8	11/24/09 08:15	1.0620				0.00		
15	TRG	ES-B-S-9	11/24/09 08:30	1.0713				0.00		

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Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
09-11114	1	C0014	grams	11/30/2009	JPACHELLA

Lab Fraction	Energy Solutions, LLC Client ID	Sample Type	Muffle Data		Dilution Data			Aliquot Data			MS Aliquot Data		H-3 Solids Only	
			Ratio Post/Pre	No of Dils	Dil Factor	Ratio	Aliquot	Net Equiv	Aliquot	Net Equiv	Water Added (ml)	H3 Dist Aliq		
01	LCS	LCS					1.0000E+00	1.0000E+00						
02	BLANK	MBL					1.0000E+00	1.0000E+00						
03	ES-SU009-S-15	DUP					1.0675E+00	1.0675E+00						
04	ES-SU009-S-15	DO					1.0253E+00	1.0253E+00						
05	ES-SU009-S-18	TRG					1.1768E+00	1.1768E+00						
06	ES-SU009-S-21	TRG					1.0972E+00	1.0972E+00						
07	ES-B-S-1	TRG					1.1166E+00	1.1166E+00						
08	ES-B-S-2	TRG					1.0587E+00	1.0587E+00						
09	ES-B-S-3	TRG					1.0358E+00	1.0358E+00						
10	ES-B-S-4	TRG					1.1454E+00	1.1454E+00						
11	ES-B-S-5	TRG					1.0930E+00	1.0930E+00						
12	ES-B-S-6	TRG					1.0774E+00	1.0774E+00						
13	ES-B-S-7	TRG					1.0763E+00	1.0763E+00						
14	ES-B-S-8	TRG					1.0620E+00	1.0620E+00						
15	ES-B-S-9	TRG					1.0713E+00	1.0713E+00						

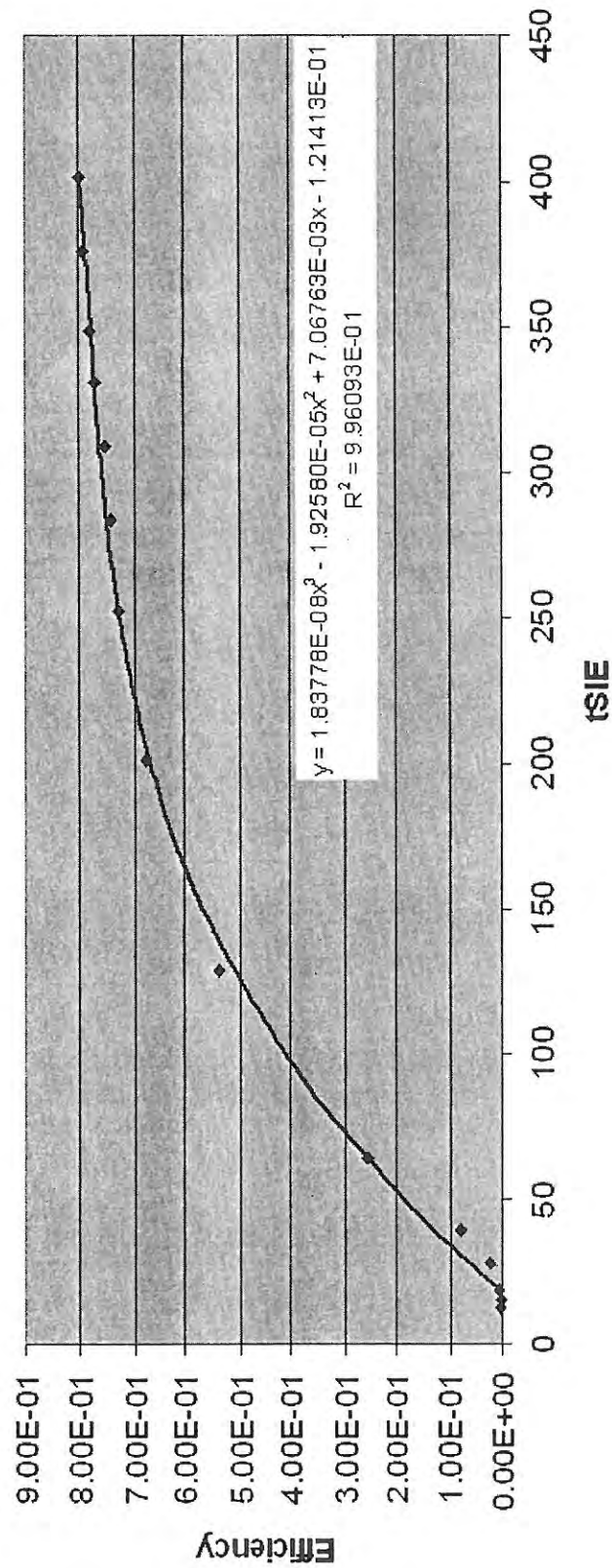
Comments

Technician: JP Achella Date: 11/25/09

Work Order #	09-11114			C-14 Recovery			 EBERLINE SERVICES	
tSIE	EFFICIENCY	Recovery Spike Activity	Grams Added	Total Activity	cpm	Bkg, cpm	Recovery Factor	
190	65.228%	3093.286	0.2512	777.0334432	563	23	1.065424051	

11/27/2009 11:25

Carbon-14 Quench Curve Using Harvey Cocktail



Protocol# 6 - C14_cpm.6.lsa

User: Default

AG
11/27/09
(B)

Assay Definition-

Assay Description:
C14

Assay Type: CPM

Report Name: Report1

Output Data Path: C:\Packard\Tricarb\Results\Default\C14_cpm.6\20091125_1328

Raw Results Path: C:\Packard\Tricarb\Results\Default\C14_cpm.6\20091125_1328\20091125_1328.results

Comma-Delimited File Name: C:\Packard\Tricarb\Results\Default\C14_cpm.6\20091125_1328\0911114 ac14.csv

Assay File Name: C:\Packard\TriCarb\Assays\C14_cpm.6.lsa

Count Conditions-

Nuclide: 14C

Quench Indicator: tSIE

External Std Terminator (sec): 0.5 2s%

Pre-Count Delay (min): 1.00

Quench Set: n/a

Count Time (min): 30.00

Count Mode: Normal

Assay Count Cycles: 1

Repeat Sample Count: 1

#Vials/Sample: 1

Calculate % Reference: Off

Background Subtract: Off

Low CPM Threshold: Off

2 Sigma % Terminator: Off

Regions	LL	UL
A	0.0	156.0
B	4.0	156.0
C	0.0	0.0

Count Corrections-

Static Controller: On

Luminescence Correction: Off

Colored Samples: n/a

Heterogeneity Monitor: n/a

Coincidence Time (nsec): 18

Delay Before Burst (nsec): 75

Half Life-

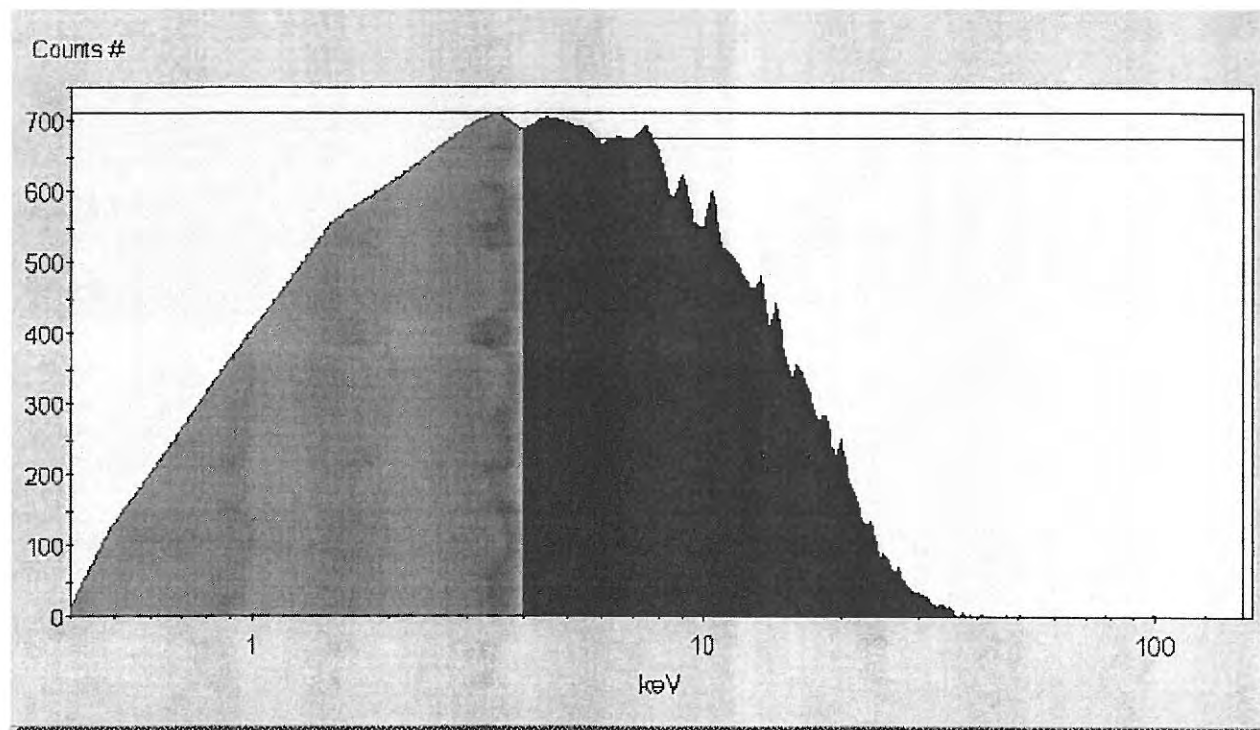
Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

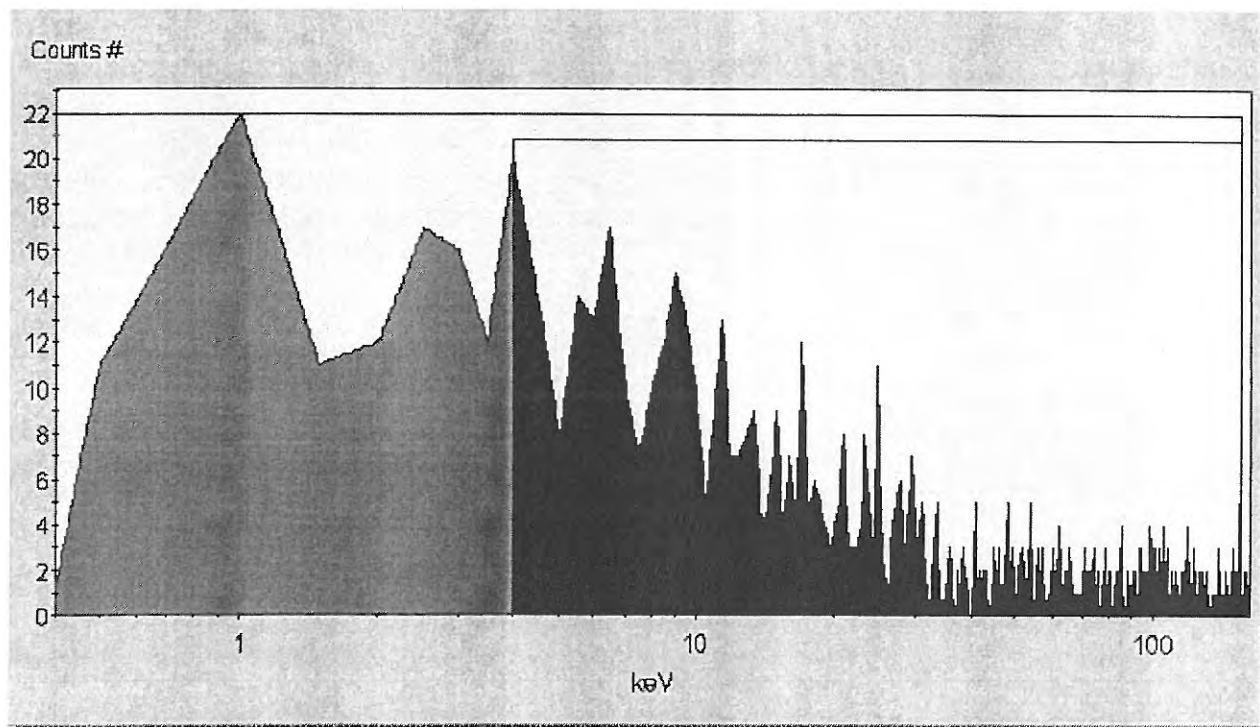
DATE	TIME	SMPL_ID	P#	PID	S#	CPMA	CPMB	CPMC	tSIE	Count Time
11/25/2009	1:30:14 PM	09-11114-1-C14-01S	6	20	1	745	619	0	191.20	30.00

SpectraView Block Data



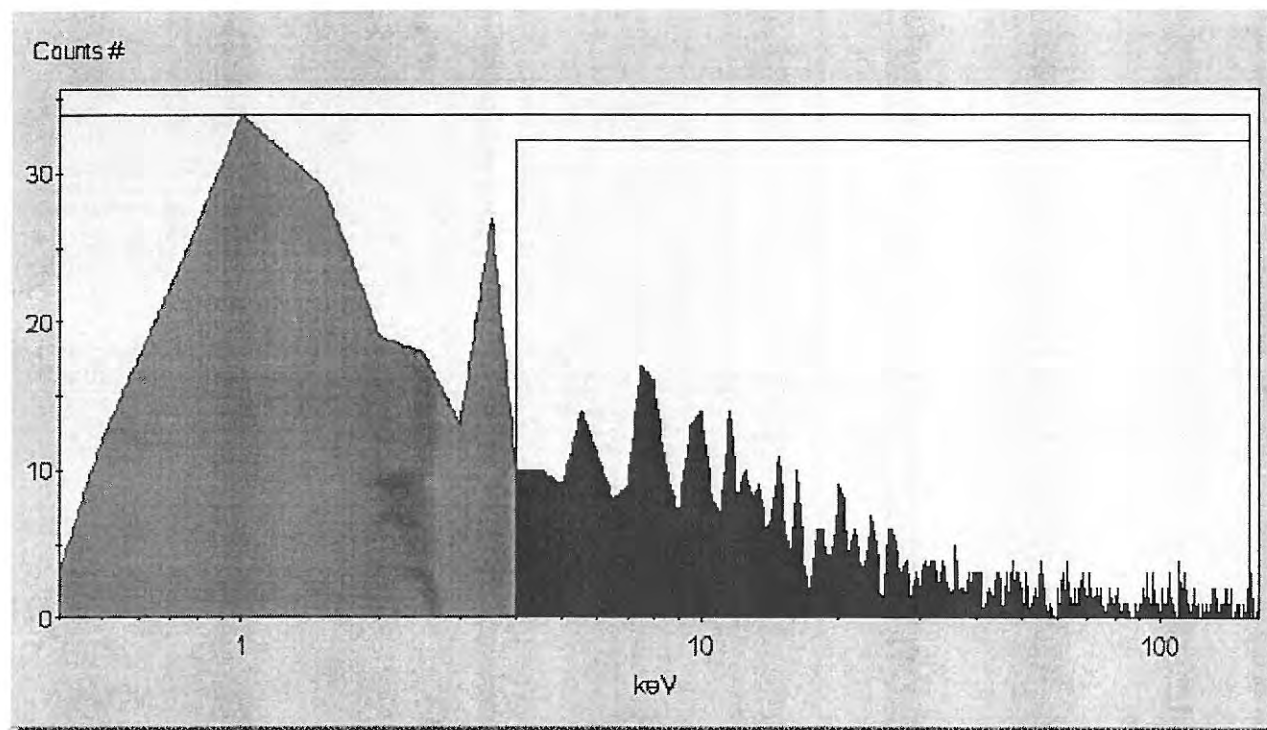
09-11114-1-C14-02S 6 20 2 28 24 0 192.05 30.00
11/25/2009 2:02:38 PM

SpectraView Block Data



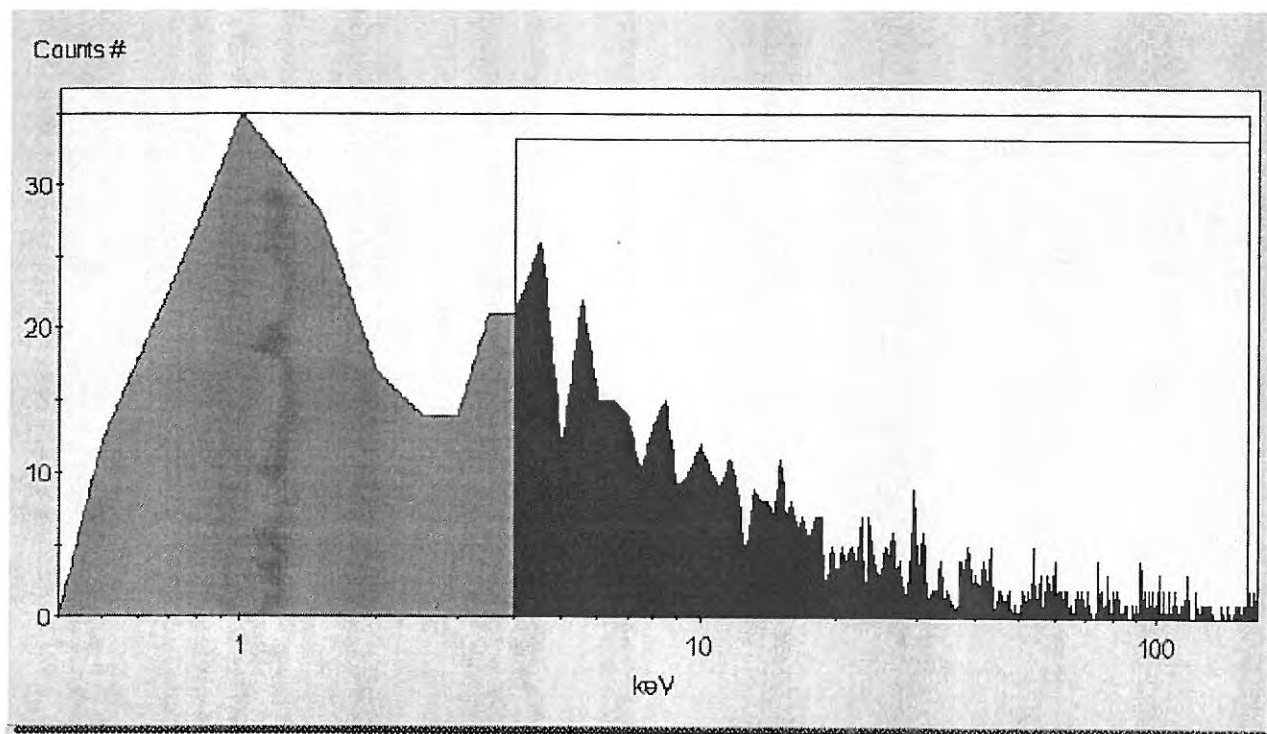
09-11114-1-C14-03S 6 20 3 26 21 0 189.06 30.00
11/25/2009 2:35:03 PM

SpectraView Block Data



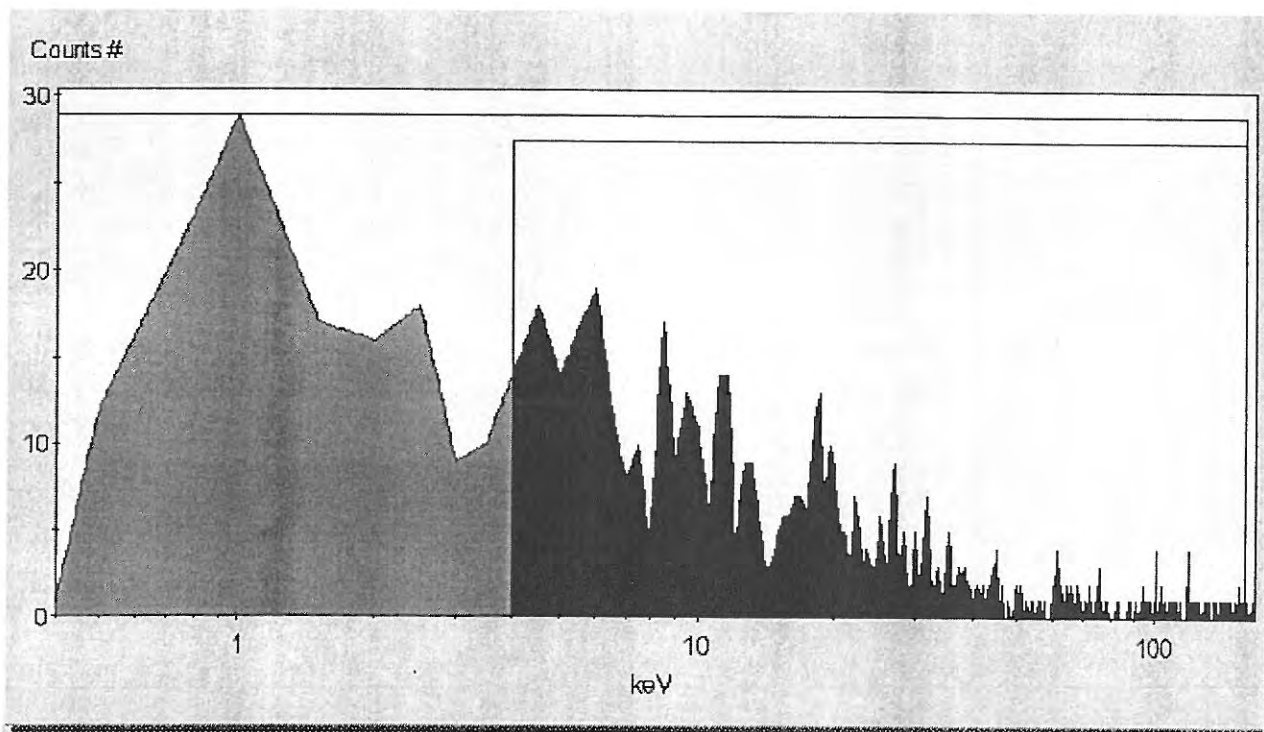
09-11114-1-C14-04S 6 20 4 26 22 0 185.66 30.00
11/25/2009 3:07:28 PM

SpectraView Block Data



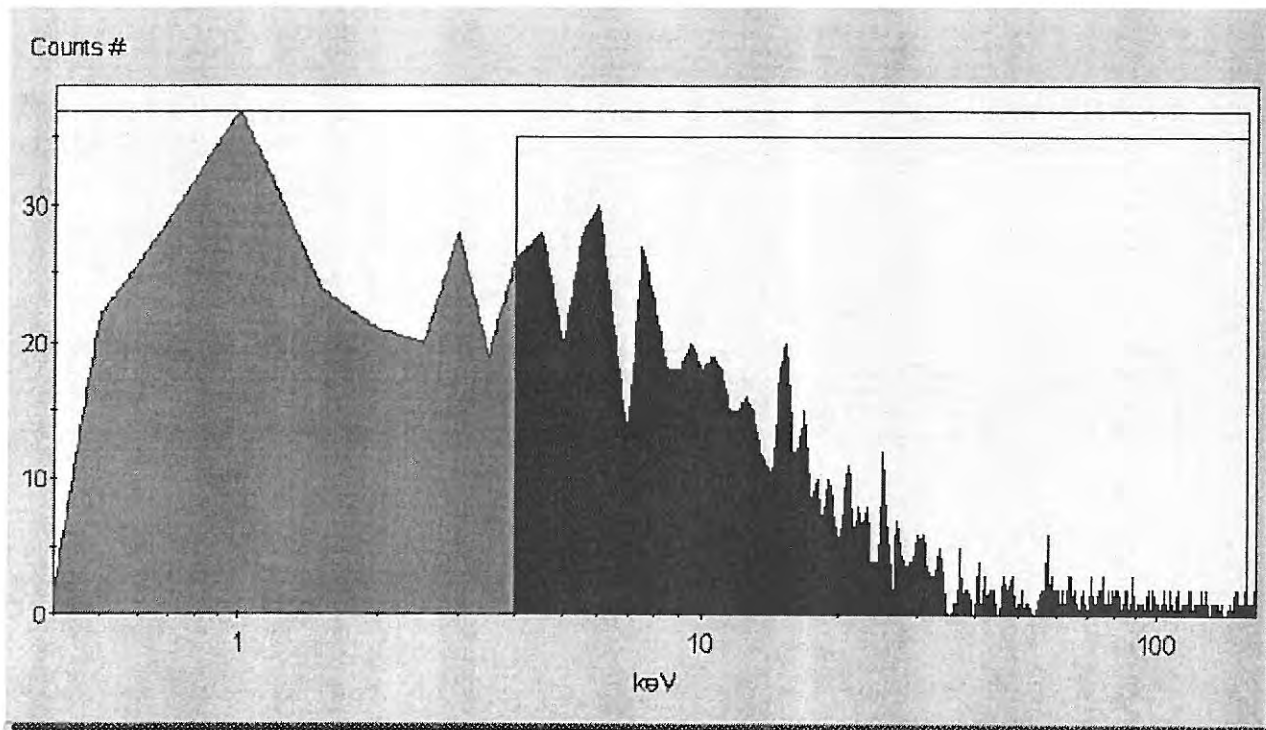
09-11114-1-C14-05S 6 20 5 24 20 0 196.19 30.00
11/25/2009 3:39:53 PM

SpectraView Block Data



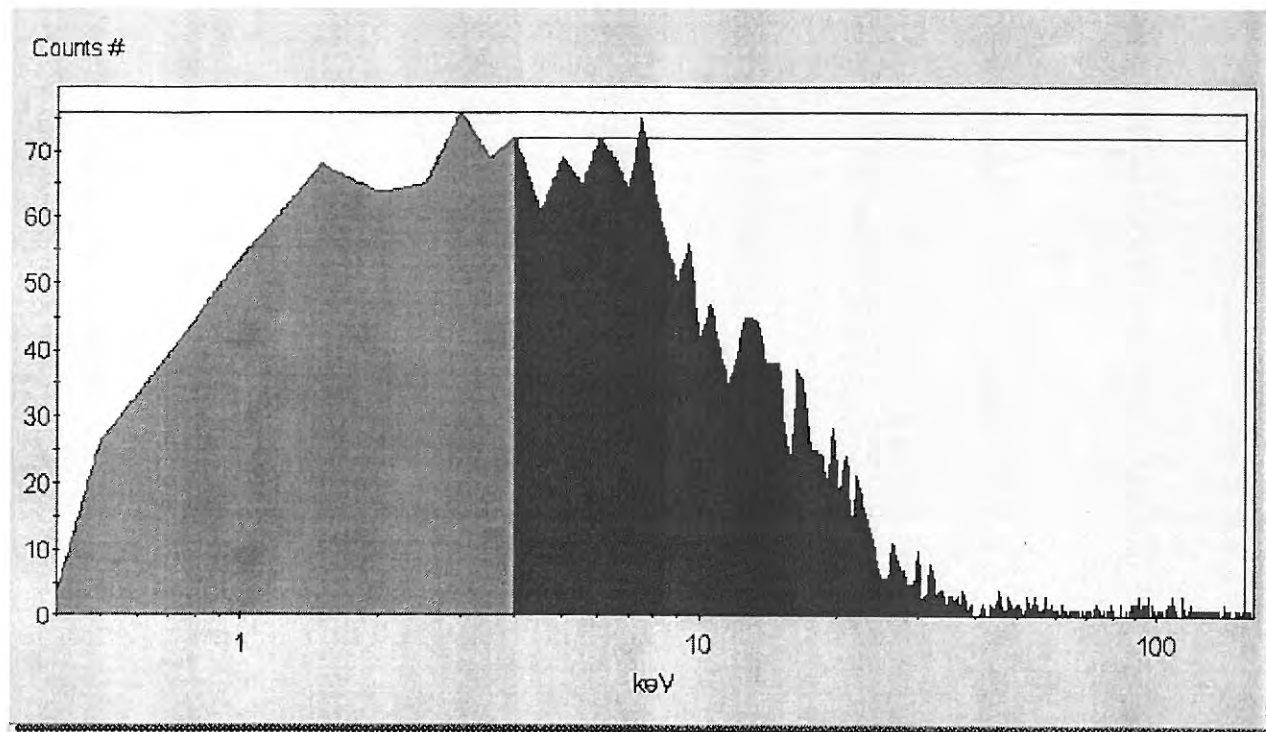
09-11114-1-C14-06S 6 20 6 35 30 0 191.40 30.00
11/25/2009 4:12:18 PM

SpectraView Block Data



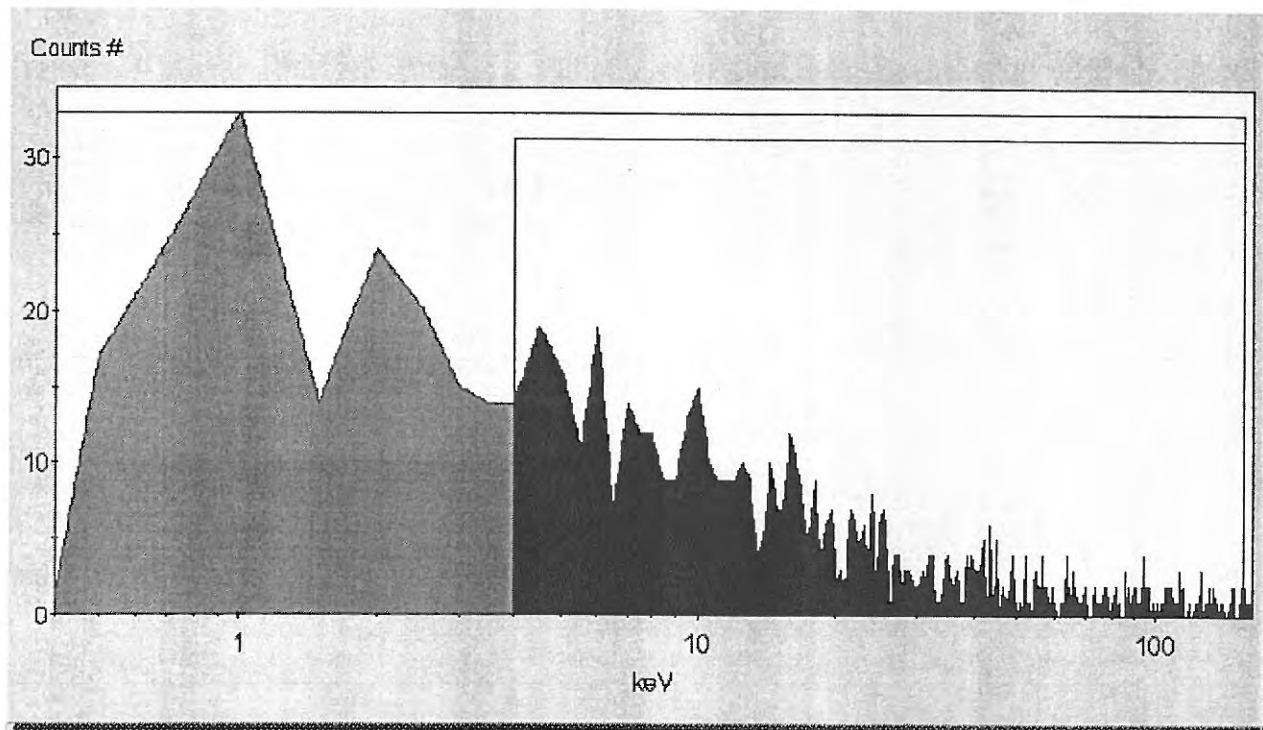
09-11114-1-C14-07S 6 20 7 78 64 0 185.46 30.00
11/25/2009 4:44:43 PM

SpectraView Block Data



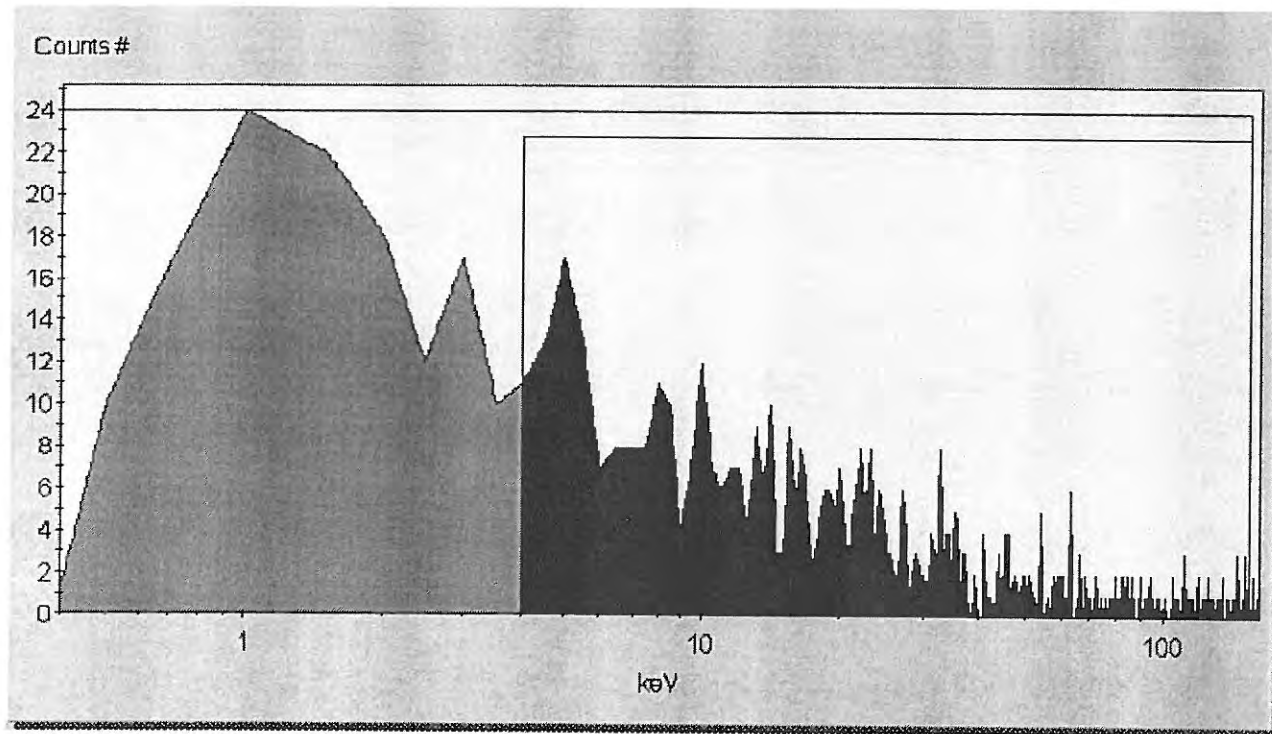
09-11114-1-C14-08S 6 20 8 26 21 0 194.54 30.00
11/25/2009 5:17:07 PM

SpectraView Block Data



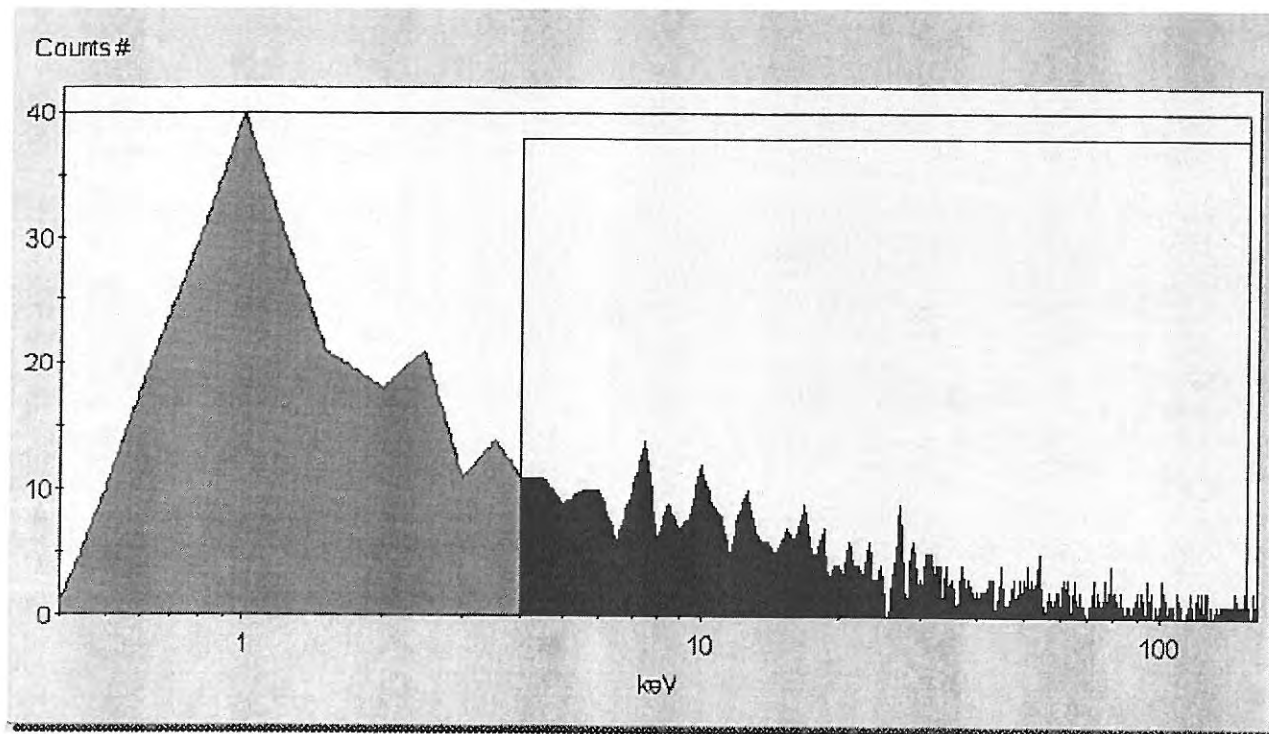
09-11114-1-C14-09S 6 20 9 22 19 0 193.20 30.00
11/25/2009 5:49:32 PM

SpectraView Block Data



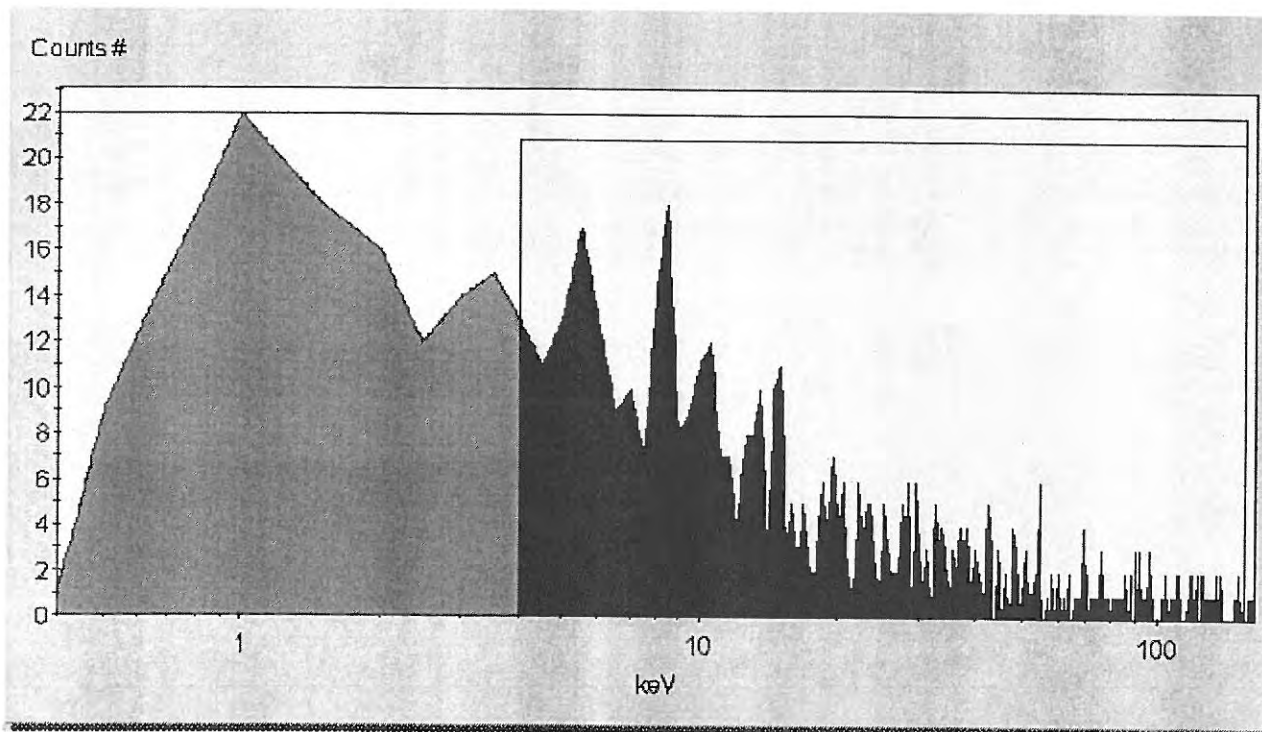
09-11114-1-C14-10S 6 20 10 23 19 0 188.99 30.00
11/25/2009 6:21:56 PM

SpectraView Block Data



09-11114-1-C14-11S 6 20 11 22 19 0 193.86 30.00
11/25/2009 6:54:21 PM

SpectraView Block Data

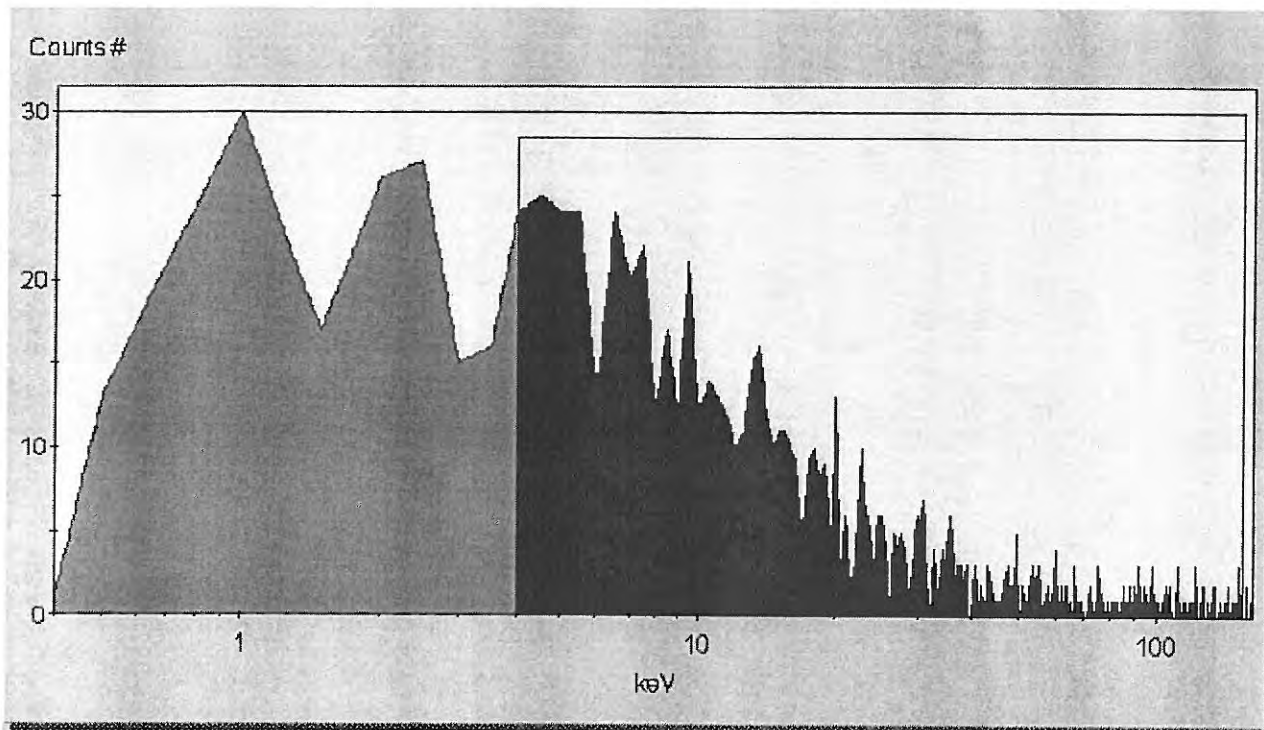


Protocol# 6 - C14_cpm.6.lsa

User: Default

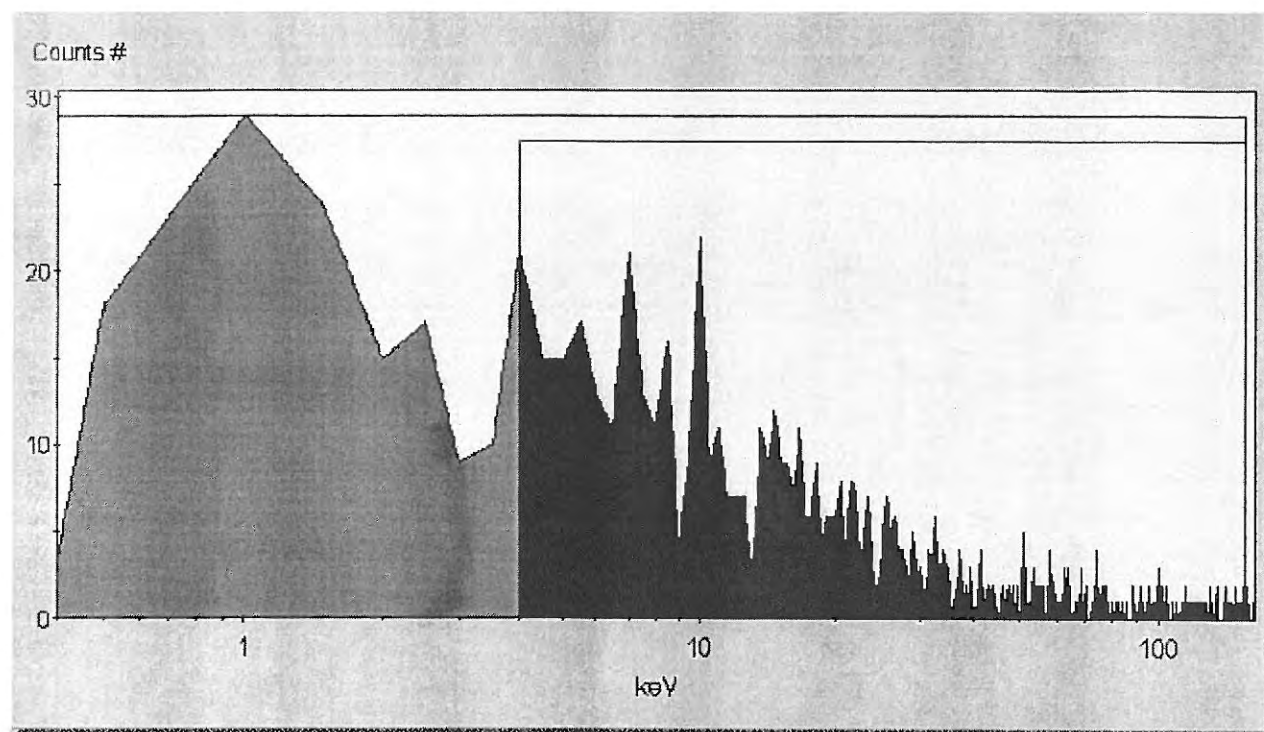
09-11114-1-C14-12S 6 20 12 31 26 0 195.98 30.00
11/25/2009 7:26:46 PM

SpectraView Block Data



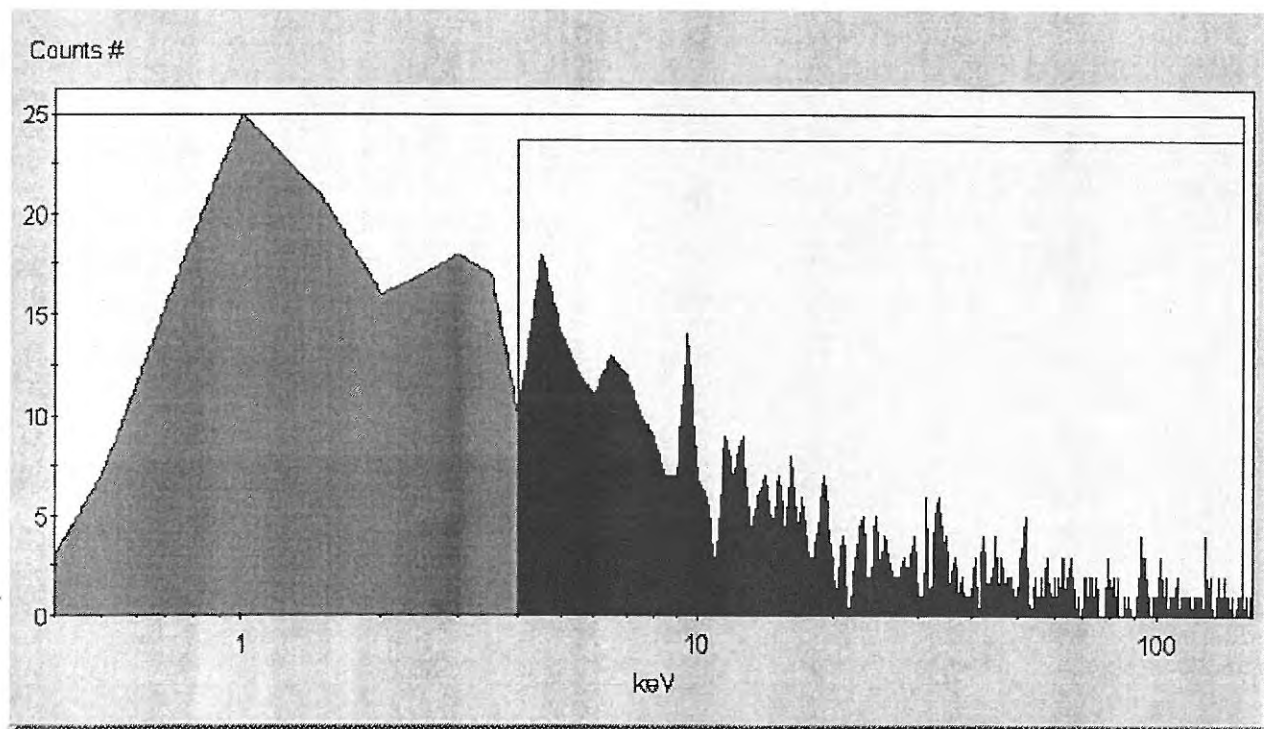
09-11114-1-C14-13S 6 37 13 26 22 0 191.40 30.00
11/25/2009 7:59:15 PM

SpectraView Block Data



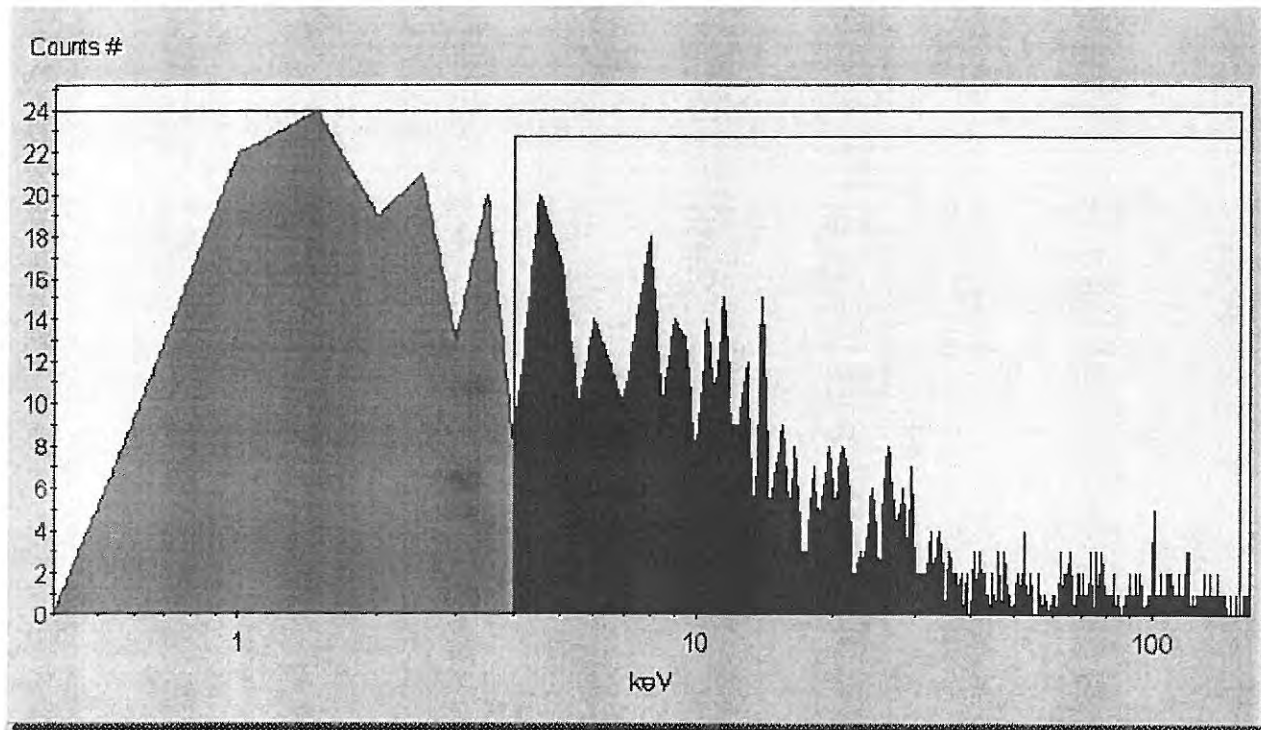
09-11114-1-C14-14S 6 37 14 22 18 0 190.11 30.00
11/25/2009 8:31:40 PM

SpectraView Block Data



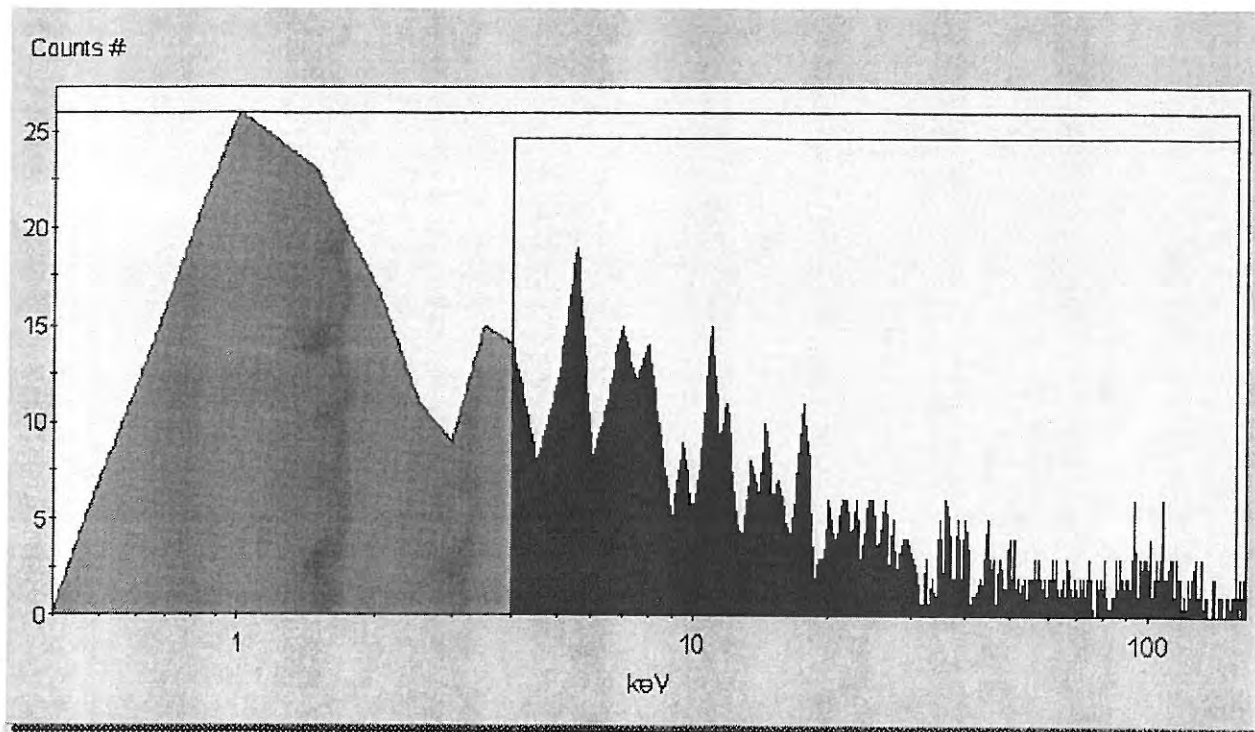
09-11114-1-C14-15S 6 37 15 25 21 0 189.13 30.00
11/25/2009 9:04:05 PM

SpectraView Block Data



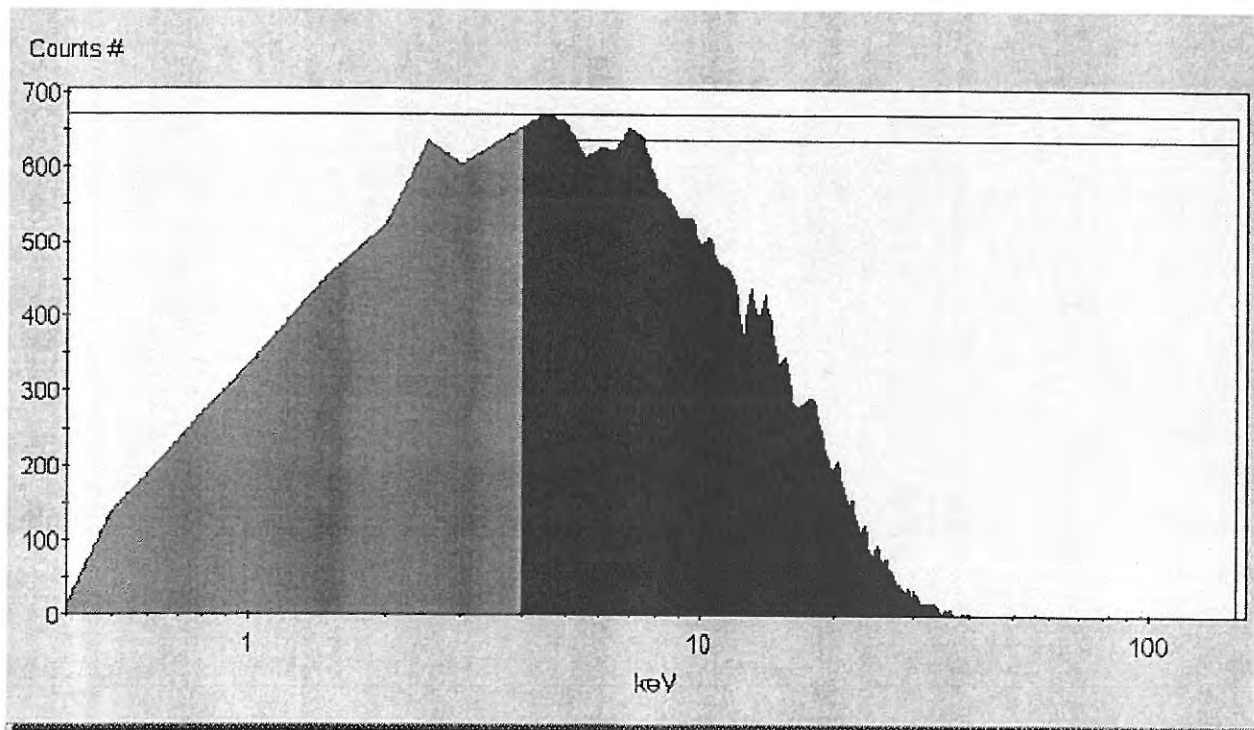
Sample #16 6 37 16 26 23 0 195.18 30.00
11/25/2009 9:36:30 PM

SpectraView Block Data



Sample #17 6 37 17 674 563 0 190.00 30.00
11/25/2009 10:08:54 PM

SpectraView Block Data



SNC Protocol

AG
11/25/09
B

Calibration Information

Software Version IC: 2.12

Software Version EC: 2.02

Instrument Model: Tri-Carb 3100TR

Instrument Serial Number: 427086

3H Chi Square: 25.88 Date Processed: 11/25/2009 8:07:03 AM

14C Chi Square: 13.52 Date Processed: 11/25/2009 8:07:03 AM

3H E²/B (1-18.6 keV): 278.48 Date Processed: 11/25/2009 8:07:03 AM14C E²/B (4-156 keV): 549.61 Date Processed: 11/25/2009 8:07:03 AM

3H Efficiency (0-18.6 keV): 63.54 Date Processed: 11/25/2009 8:07:03 AM

14C Efficiency (0-156 keV): 95.97 Date Processed: 11/25/2009 8:07:03 AM

IPA Background Date Processed: 11/25/2009 8:07:03 AM

3H Background CPM (0-18.6 keV): 14.55 Date Processed: 11/25/2009 8:07:03 AM

14C Background CPM (0-156 keV): 21.13 Date Processed: 11/25/2009 8:07:03 AM

3H Calibration DPM: 207400

3H Reference Date: 10/29/2007

14C Calibration DPM: 120521